opt MAGAZINE

SUMMER 2016

optMagazine.com

the BIG COLOR THEORY

An in-depth look at color & light and the impacts it can have on you, your business & your customers

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A SMART and PROFITABLE NICHE

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RAINBOW RISING: BEHIND the SCENES with CHROMATIC ABBERATION

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ALSO INSIDE: What Causes Color Blindness? | Daily Soft Contact Lenses 2016 | It's Time To See Your Dentist

Vol. 1 — Issue 2

LETTER from the EDITOR

Hello, and thanks for tuning in. As we move on to our second issue of the magazine, we've been impressed by the amount of positive feedback that we've gotten so far. We also, thankfully, got some slightly less-than-positive feedback. I say thankfully because it's always good to know what we can do better. Continuous improvement is what we're striving for, and we've made some tweaks to the layout and presentation of some parts of the magazine to try and give you the best possible OPT Magazine Reading Experience™.

In this issue, we (obviously) are exploring color and how it affects you on a day-to-day basis. A lot of the articles discussing color in this issue are from the point-of-view of our graphic designer, and not that of an optical professional. I'm hoping that's going to give us a little bit of a different view on the subject than you may otherwise get. We also tried to work in some real-world examples that you may have dealt with before, since colors isn't just about what frame looks fashionable. It can affect everything from how the patient feels about themselves, to how other people perceive them. The intent is to give you some new ideas and ways of thinking about the subject so that you can apply your own experiences and office situation and find something useful in there.

In this issue we're also still trying to shape the feel of the magazine, in terms of how our articles are laid out and presented. As I said in our first issue, we want to make this magazine not only useful, but also interesting. So as you go through the magazine, please let us know what you like about it. Even more importantly, let us know what you don't like about it. Since I'm not the one out there in the office every day with patients, I rely on you (well, not specifically you, but readers in general) to let us know what *you* want to know more about, or what subjects you've heard enough of.

Special Thanks

We wanted to give a special thanks to the independently run optical lab **FEA Industries** for their contributions and continued support. They help make sure OPT stays the best magazine ever.

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On the cover this issue

Mandatory Frame AND THE ADVERTISEMENT

HOGWARTS COLLECTION
premium frames

"I solemnly swear that I am up to no good"... and that includes selfies. At the risk of calling attention to the Dementors, we are here-by required to have at least one frame ad. They were, however, non-specific on what type of "frame".

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the BIG COLOR THEORY

the 'feeling' of colors

Our experience with color typically begins with a sensation that is an actual, physical event that stimulates us on a variety of levels. But are we always consciously aware of how color is stimulating us? In this article, we will take a quick peek at what is happening 'behind the scenes' in our minds and the effects that color can have on our mood and personality.

Color Perception: More than meets the eye

The average person has 5 senses that connect them to the world around them; sight, hearing, taste, smell and touch. Vision is the most important of these senses and, as human beings, we are drawn to light and to color. Each one of the 5 senses is actually an incomplete event when it happens. When one of these senses, like vision, for example, is triggered it is immediately followed by perception. Perception offers us an understanding and awareness for when a sensory event is triggered. It helps us to identify a sensation and better focus the stimuli we have towards what we are seeing. Color plays a significant role when it comes to this recognition of perceptions and allows us to place a 'value' on what we are seeing. Sometimes we do it consciously like using a red folder to identify bills or to call-out important information; sometimes subconsciously, when our mood is changed when we see the warm amber glow of a fireplace.

Color can change how our body feels. Changing the strength of the color can further manipulate this stimulation we experience. There are biological responses known as **phasic arousal** that are quick, short bursts (like adrenalin) of response to a color and based on a situation. These are the much more immediate, '*first impression*' responses and reactions that we can have towards color. The stronger the color, the stronger the impact.

— Robert Norman "Bob" Ross

A longer lasting biological response to color is known as **tonic arousal**. This is much more normal for a body to experience and is achieved as the brain makes constant adjustments to keep this mood or feeling. This typically occurs after the initial phasic arousal experience and drives this emotional response long afterwards. These are some of the tricks that designers (graphic and interior designers) can use to invoke a mood, play on our emotions and alter our behavior. Designers use color to direct a viewer's eye through a design or call attention to information, but can also use it to manipulate, stimulate, excite, arouse, depress or calm a viewer.

I'm feeling blue... or am I?

How often have you heard someone use that expression or have used it yourself? Is it a neurological response to the shortened lightwaves of the color blue that makes us sad? Or is there an association with something blue that happened long ago that this phrase was coined from? It is a cool, comfortable color that can relax us. If you google "*where does the expression feeling blue come from*", you will get a myriad of results and opinions that may or may not be correct. Don't you just love the internet? Anyway, there are several plausible explanations/reasons for this expression (far beyond the scope of this article) but ultimately it means sad. So when we hear someone say that, we immediately have an emotional response, feel empathy and have our own association to feeling blue before we can even ask them 'why?'.

Color, like so many other things around us, is also subjective. It doesn't always mean the same thing to other people and is not always seen the same way. Color is also seen differently by people. My fovea, rods and cones are different than yours which are different with everyone. On average, for most people without an eye disease or issue, they function the same. They give us a good 'ballpark' or a shared color experience with others, but remember that everyone is as unique as a snowflake and no two will ever see the same.

Personal experiences and associations will also vary the impression of blue. There are, some people, that just don't have a bad day and everything is positive in their world, including their colors. I'm an artist and a designer... I am grounded and reality based. My colors in life tend to be darker, moodier, more brooding... black, cool grays, deep tones. These colors make me feel comfortable and they align with my personality. My significant other however has the complete opposite personality and colors in her wardrobe. Bright, cheery, vibrant colors that align with her personality. Funny enough, our color palettes are completely opposite on the color wheel and you know what they say about 'opposites attracting', but I digress... Clearly there is some link or connection between our personalities, behaviors, and colors but where does it come from? Some attribute it to the personal relationships and associations we've had with color in past experiences. Others may say that it is a product of our environment or a byproduct of social and/or cultural influences.

Colors, Countries and Cultures

With the advent of the Olympic games this year, nowhere do you have such a gathering of people from all through-out the world. Countries are represented by their athletes and fans and they all carry the colors of their country found on their respective flags. The colors of the flag is very important to those representing each country. These colors have meaning and stand for something. Those that are carrying the flag and supporting their respective country, have strong associations with those colors. Yes, the way the colors are arranged and the supporting graphics also give meaning, but the colors are the strongest. I can say 'the Red White and Blue' without showing you a U.S. flag and you will still likely associate with it because you know what it means and what it represents. It can also generate feelings and evoke moods within people.

Why are there different colors that represent different countries? Some of it has to do with things like climate, the environment, and the landscape of these countries. Colors that are indigenous to those regions. Some colors were perhaps chosen by a single person that viewed a particular color to stand for something that they, in turn, wanted their country to be represented by. Whomever was in charge of creating the colors for a countries' flag, used a myriad of things to determine what colors were going to be used. Their world around was often used to draw inspiration.

Even though we are under the Red White and Blue here in the United States, if I say 'desert southwest colors', there is an immediate association with certain colors indicative of that region, like burnt orange, teal and golden yellow. Colors in this region are often warm and feel a little 'dry' or less saturated. These colors are found in the environment and are colors used, for example, by the Native Americans that relate to their surroundings and represent certain things to them. The colors of the sunsets and how they affect the color of the rocks in the canyons and deserts, among other things, are part of their culture and are represented in their clothing and apparel. If I say 'pacific northwest colors', darker, cooler, grayer saturated colors come to mind because of our association (and/or knowledge) of that particular region because it's typically cool and wet. This isn't always the case with all colors, countries and cultures but it is one example of how color makes us feel. Think about your environment (dispensary) and how it might be making you or your customers feel.

Color Symbolism and Meaning

Our responses to color are not just biological but are also influenced by the associations we have from our culture and our environment. Color has been adopted to represent certain things to us but still won't ever mean the same to everyone. Take our society, for example. We have lots of streets with cars and traffic lights. We know what red, yellow and green mean as they pertain to these lights because it is common place in our society and further enforced through teachings in school and drivers ed. But what if we were to put a traffic light, say, in the middle of the Amazon rainforest where there are tribes that have no contact with the outside world. What do these colors mean to them?

Color has been averaged, grouped and categorized to make understanding them a little bit easier for us over the years. It may sound a bit harsh that color has been 'treated' this way but it's not all that bad because of how it helps us today. The color wheel itself is a trimmed down version of the gazillions of colors available in our visible spectrum, which we use as a guide.

'Feeling' Your Color

The following page shows a simple sampling of the basic colors and what some of the positives and negatives of each color are. This color guide is merely to help you understand color traits a little better. It is also a good starting point for you to 'ballpark' a color choice if you need one. This basic understanding of colors can be used as a reference for let's say, the colors of your logo or website. The colors of the walls and floors in your dispensary. Even the color of frames and what type of personality it can offer to a customer.

Color has a powerful psychological impact on people's behavior and decisions. Open a yellow umbrella on a rainy day and you'll make someone happy. Designers and marketers tap into this to create an emotional response and to stimulate you to purchase something. Color can be the reason why a patient feels comfortable (or uncomfortable) in your dispensary and can also be a trigger for making a purchase simply because of 'how it makes them feel'. So ask yourself, what color are you feeling?

red

Physical

Positive: physical courage, strength, warmth, energy, love, power, stimulation, masculinity, excitement

Negative: defiance, warning, anger, strain, aggression, visual impact, danger

green

Balance

Positive: harmony, balance, refreshment, rest, restoration, reassurance, environmental awareness, equilibrium, peace

Negative: boredom, envy, jealousy, stagnation, blandness, enervation, guilt

orange

Optimism

Positive: confidence, food, warmth, security, sensuality, passion, abundance, fun, courage

Negative: deprivation, frustration, frivolity, immaturity, ignorance

blue

Intellectual

Positive: intelligence, communication, trust, efficiency, serenity, duty, logic, coolness, reflection, calm

Negative: coldness, fear, aloofness, lack of emotion, unfriendliness

yellow

Enthusiasm

Positive: optimism, bright, energy, confidence, self-esteem, extraversion, friendliness, creativity

Negative: irrationality, fear, emotional fragility, depression, anxiety, unstable

purple

Spiritual

Positive: containment, vision, luxury, authenticity, truth, quality, royal, noble, ambition, spiritual awareness

Negative: introversion, decadence, suppression, inferiority, moodiness

brown

Supportive

Positive: seriousness, warmth, friendly, nature, earthiness, reliability, support longevity, conservative

Negative: lack of humour, heaviness, lack of sophistication, dogmatic

gray

Unemotional

Positive: autonomy, balance, calm, neutrality, security, reliability, intelligence, solid

Negative: lack of confidence, dampness, depression, hibernation, lack of energy, gloomy, fear of exposure

black

Power

Positive: sophistication, classy, glamour, security, emotional safety, dramatic, efficiency, substance, timeless

Negative: oppression, evil, coldness, menace, heaviness, death, mystery, intimidating

white

Awakening

Positive: hygiene, innocence, sterility, clarity, purity, fresh, cleanness, simplicity, sophistication, efficiency

Negative: sterility, coldness, barriers, unfriendliness, elitism, isolation, emptiness

the BIG COLOR THEORY

RED AND YELLOW,
PINK AND GREEN.
PURPLE, AND ORANGE,
AND BLUE...

I CAN SING A RAINBOW.
SING A RAINBOW.
SING A RAINBOW TOO...

— W. Carter Merbreier

⚠ WARNING
The following article contains high amounts of 'nerd'. Pace yourself so that you may live long and prosper.

Did you ever have a patient, customer, friend or other, say something to the effect of "that doesn't look like it did on my computer" or "this doesn't look like it did in the catalog" when they buy something from online or get it home? How about when you print family pics that were taken with a smart phone or digital camera? What about when you went to your local home improvement store for some paint for a room in your home? You either had a color in mind, picked through their color samples or even brought in a picture from a magazine that has exactly what you want and asked them to 'match it'. Finally, you get it home and go through all of the labors of moving furniture, cleaning, prepping the surface, painting, trimming, and putting everything back in place. You step back and...you don't like it. It doesn't look like it did before. Well, you are not alone when it comes to this issue and, if I may, let me try to shed some light on this...

GO TOWARDS THE LIGHT

In this article, we will take a look at the 'birth' of color (if you will). Now I promise, this isn't going to be as scary as when Carol Anne was told to go towards the light in Poltergeist, but there are some 'interesting things' and 'strange phenomena' at work here as it pertains to color and it is all about the light. Light is energy and the phenomenon of color is a product of the interaction of energy and matter. Color is a sensory event and the beginning of every color experience is a psychological response to a stimulus of light. Without light, there is no color. With light, there is an overabundance of ever-changing colors.

This light and/or matter has the ability to vary the way color is perceived, producing varied results. Not only that, but color is also subjective. One person's idea of what a 'true blue' is will differ from another's idea of what it is. Is the correct color the one that most closely fits a certain formula? Or is it the one that most closely matches what you think it should be? Color and light work hand-in-hand and there are two primary ways that color is experienced; direct light (Additive) and reflected (Subtractive) light. Let's take a look for a moment at one of the main reasons for these 'color issues' and perceptions in this day and age of digital devices.

ADDITIVE AND SUBTRACTIVE COLORS

All colors, whether they are seen as additive or subtractive light, are unstable and the results are largely due to (*but not limited to*) changes in the light and surface or medium (*or matter*) that they are viewed on. I mentioned previously, that color is experienced in two primary ways and it's actually a pretty simple distinction between these two.

Additive-based colors are anything that is 'lit by light electronically to create colors'. This means your television, computer monitor, smart phone, tablet, etc. are all creating colors by radiating light into a luminous object like a light-emitting diode (LED) into sub-pixel clusters. These clusters are typically made-up of only 3 colors: red, green and blue. However, these 3 colors can remarkably create a whole sub-set of millions of colors for us to look at. They stimulate our senses and make us believe it is a 'real-to-life' representation because that's what we spend the majority of our time looking at these days.

Electronic viewing devices use a black screen and need to add light to create color. Oddly enough, additive color is really only a product of 20th century technology and hasn't been around that long. Despite it being relatively new, it has taken over our society, our lives, and is now what many people are basing "what it should look like" on. Don't believe me? How many people do you know (*yourself included*) that do the majority of their shopping online and don't even bother going to stores anymore? We think that because we are looking at a picture, taken with a camera, that it is a 'real-to-life' representation. But it's not. It is so common these days that it has become 'default'. It is actually a simulation that we perceive as 'good enough' when, technically, it is only a fraction of the actual colors available in the real world, which I'll explain in a moment.

Subtractive-based colors are the colors we see in the physical world around us that are lit naturally and not lit by electronically harnessed light like a computer display. The colors of Bryce Canyon, paint daubs on canvas by Monet, the grass, flowers, carpeting, walls, tapestries, clothing... even this magazine. All these and much more are considered to be Subtractive. Subtractive-based colors are the result of the majority of light waves being absorbed by an object or surface and those that are not absorbed are reflected back, giving us the color we see. In the print world, cyan, magenta, yellow and black are used to create the majority of what we see in print. Paper is white, so printers need to remove light to create color. Canvas and artist's paper in general is also a form of white so artists have their own set of colors to use and mix (red, yellow and blue). Either way, the end results are produced by light waves being accepted and rejected, thus resulting in the colors we see.

I know that this is only a 'high-level' breakdown of the two primary types of color that we see but, with that, we can begin to see that there is already a big difference in the colors used in our daily lives. Additive uses the **RGB color space** and Subtractive uses **CMYK color space**. This is a huge reason/culprit why colors we see on the computer never look the same when you hit the print button and is a big reason why people will say "it doesn't look like...", as I wrote in the introduction. To better understand these differences, let's take a closer look at the differences between these color spaces...

SUBTRACTIVE MODELS - CMYK & RYB
Cyan, Magenta, Yellow & Black | Red, Yellow & Blue

Starts with White
Colors appear when different wavelengths are subtracted
For printed material

ADDITIVE MODEL - RGB
Red, Green & Blue

Starts with Black
Colors appear when different lights are added
For computer displays

COLOR SPACES AND BEYOND

Additive Colors, on most computer displays, have 3 primary colors. Red, green and blue. Mixing some of these colors will produce paler secondary colors like cyan, magenta, and yellow. Mixing all of the primaries at once will produce White. Remember, this is color generated by light; not paints and pigments. Modern computer displays and devices will represent each color (RGB) with each color having 256 shades. This combination of RGB gives us over 16.7 million colors and has become widely accepted as what the human eye determines as true or 'real-to-life'.

Subtractive Colors, like pigments, are more familiar to us when it comes to mixing colors. Red, yellow and blue, are the primary pigment colors here... the same colors you may have learned about in kindergarten. Mixing combinations of two of these pigments will give you secondary colors like orange, purple, and green. Theoretically, mixing all of these primaries will give you black... although that's actually not possible.

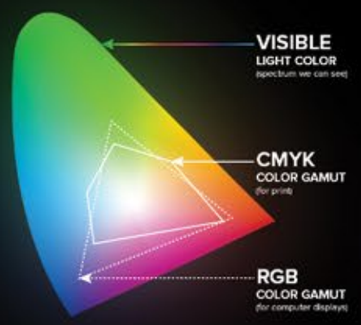
As it pertains to print these days and CMY (cyan, magenta, yellow), each color has a value from 0% to 100% and can produce 1 million color variants. The addition of black (K) helps remove more light from the white of the paper and provides shades for more color variations. The cyan, yellow, and magenta inks for printing yield better results for allowing light to penetrate and mix with the white of the paper than the traditional artist colors of red, yellow and blue.

RGB has a larger color space or **gamut** (below) of color than the CMYK gamut does. When you are viewing an image on-screen and want to print that image, the printer does not offer enough color with CMYK to allow for all the colors to show. Colors are converted and/or 'dropped' when you print from a computer, which is why your print never looks the same as it did on screen. It looks a little darker, a little less saturated, and a little duller. The white or 'brightness' of the paper also mutes the colors because it's not as bright as the light on the monitor. This is one of the major areas for discrepancies with the perception of color and having an unhappy customer. You can extend the color range of CMYK by using pre-made inks known as spot colors, which will certainly raise the overall quality of the print, but it will also significantly raise the cost. It also won't actually solve the issue, as it still doesn't get close to the visible spectrum.

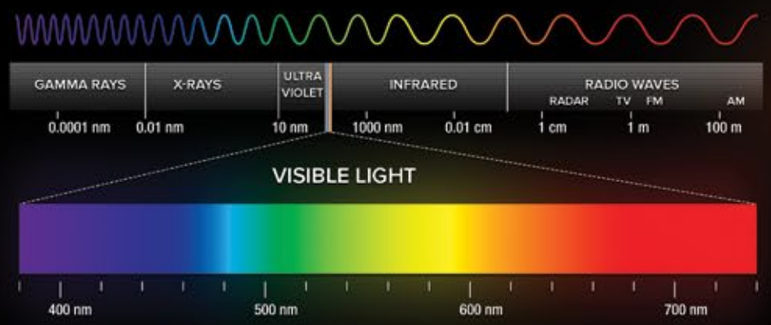
The Visible Spectrum (below) is what humans can see. Despite the differences in color spaces between RGB and CMYK, with RGB having more colors available, they fall well-short and are only a fraction in comparison, to the Visible Spectrum. The Visible Spectrum contains numerous colors that are distinguished by wavelength, which determines color, and by amplitude, which determines brightness. The combination of these light waves produces white light, which is what we see from the Sun and from most artificial light sources. What we can see with the human eye is known as **Visible Light**. Speaking of light sources...

Amusing Factoid

The visible spectrum is often identified by the seven prominent colors we see in the rainbow. In 1666, Isaac Newton named these colors Red, Orange, Yellow, Green, Blue, Indigo, and Violet. These are often referred to by the mnemonic acronym ROY G BIV. Interestingly enough, of all these 'visible' colors, the human eye can distinguish about 10,000... even though we are looking at trillions of colors at one time in the real world as we tend to 'average' this myriad of colors together based on a 'threshold of vision' where we can't distinguish between 2 close color samples.



COLOR GAMUTS



VISIBLE SPECTRUM

THE PHYSICS OF LIGHT

Physicists explain color as a function of light. Color is a visual experience and is only available and seen by light. Not all light, however, is created equal. As a result, this creates a lot of instability in the way color changes. Light is visible energy that is emitted by a light source and it does so in the form of pulses or waves. Light may travel at the same speed, but the waves are emitted at different frequencies. The distance between the peaks of these frequencies is known as **wavelengths**, which are measured in **nanometers** (nm) (bottom left). The human eye is only sensitive to wavelengths that range roughly between 780nm and 380nm. Infrared lies just below red light and ultraviolet exists just above violet light. Both of these are invisible to humans and most other critters *(although some reptiles see infrared; some insects see ultraviolet*).

When you shine white light through a prism *(or look at a certain Pink Floyd album cover*), the prism refracts the light into separate colors (wavelengths) that make up the white light. Each of these wavelengths bends at a slightly different angle and emerge as a single color: red, orange, yellow, green, blue, indigo or violet (ROY G BIV). The strength of the white light has a lot to do with the strength of these colors as does the quality of light. The surface, thickness, composition, opacity, translucency, refraction values and other factors of the object/matter will affect the light passing through and also have an effect on the colors produced.

A manufactured light (*better referred to as a lamp*), such as a light bulb, are all designed to emit white light with RGB. The problem is there is no 'standard' for this white light, nor will it ever be pure white. Each one of these lamps provides light of a slightly different color, temperature, and quantity of light, even emitting all 3 primary colors. Various lamps emit more or less of certain colors of RGB and are measured in the **Kelvin Light-Temperature Scale** (below).

All of these variations in the manufacturing of the different lamps will yield different visual results of the colors we see. A typical incandescent lamp in your home has a low temperature around 2600-3000K and provides a warm-white, yellowish light. Lamps that have a higher temperature like LED's in your computer screen, have a medium temperature in the 6500-7500K range and provide a cool-white, bluish light. The variation of color emitted will greatly alter the resulting color being viewed. Think about those new fancy 'energy saving' bulbs and how it drastically altered the look of everything in your home or office when you changed them out.

You can also see these differences in quality of light by going to a local electronics retailer and looking at their 'wall of televisions'. If you look at them from a distance (they are usually running the same, synchronized promo on all of them which helps in this case) you can see the variation of light, colors, and quality of the different devices. Your more expensive or high-end devices like Apple products, generally have a higher luminance value around 375 cd/m2 whereas 'average' displays hover around 250 cd/m2 (*candela per meter squared* (cd / m 2)). A candela is the standard unit of luminance and represents a luminous intensity from a surface that is 1 square meter. This difference in luminance drastically alters the quality of the vibrancy and saturation of the colors we see. When you are staring at 1 device at a time, you have nothing to compare the quality of light and color to and you end up accepting what you see as being correct which becomes 'your benchmark' for what something should look like. Is your head spinnin' yet?

KELVIN LIGHT-TEMPERATURE SCALE

OH WHAT FRESH HELL IS THIS?

Just as Morris the Cat was very finicky, so too is color under various lighting sources (above) but there are even more variables to factor and consider. Just like we have a varying array of luminance values for Additive-based colors, we have varying values of brightness for paper and Subtractive-based colors.

The brighter the paper, the more vivid and vibrant the print can be. The surface of the paper also plays a key role here. Average copy paper is very rough (and dull) and will make colors look darker. Not only is the paper thin with a level of translucence, but the roughness of the surface allows light waves to bounce around more and create muddier colors. Higher quality paper with a smooth finish will allow the colors to be more accurate and true.

It's the same when you try and paint your walls at home. If you do not prime the wall and just paint over top of a pre-existing color, you will not get accurate results with the color you chose. A primer provides a smoother and whiter surface for your paint to be applied to and allows the color to be more true and accurate. Otherwise, you may have to do 2 or 3 coats of paint over the top because the light waves are not hitting an ideal surface to show the color accurately. Paint and pigments, much like CMY (depending on the color), have varying degrees of opacities which will allow more or less light to penetrate the surface. This can wreak havoc on your 'desired color'.

Speaking of the colors of the walls, a wall color can alter the color of adjacent walls. So too will the types of lights that are used in that area; as will the color of the carpet, flooring, ceiling, furnishings, mirrors... basically everything will have an effect on the wall color. Go ahead and make that inquisitive sound that Scooby Doo does if you haven't already.

What is happening here is something referred to as Global Illumination (below). Global Illumination is the bouncing of indirect light. When light hits a surface, 'x'-amount of colors are absorbed and 'y'-amount are reflected. Not only does this give us the color we see, but if the area emitting these bounced waves is big enough, light transfers from one surface to another, carrying color and providing a 'color-cast' on adjacent surfaces. This bounced light is how we can see under our desks. There's no direct light source under your desk so how is it lit? Bounced light.

Think about going to the movies. Outside of the safety lights (and the few people who can't put away their smart phones for 2 hours), what is the lighting in the theater? How can you see people's faces? The light source is the projector behind you... but when it hits the screen, the screen becomes a secondary light source and bounces light. This bounced light has colors in it... the same colors you see on the screen and will light-up people's faces with a paler, less saturated version of those colors.

Primary Light Source: Projector
Secondary LIghting: Movie Screen
Tertiary Lighting: Walls, Floor, Ceiling, Seats etc...

The colors of the environment, the lighting within that environment, all affect and manipulate the colors we see and will never really give you a true color.

Looking at this scene, you can see the 'color cast' from the projection of the screen. This is created by bounced light. Once light hits a surface, it will always carry colors from that surface to all other surfaces it encounters. These surfaces will in-turn, reflect colored light and so on.

The last aspect that I wanted to touch on regarding color and light is what can happen when you start applying light filtering colors over top of something that is already tinted. Remember that Subtractive-based color is created by natural light and further manipulated by the quality of that light and the surface that the colors are on. Color is the result of light waves that are reflected and were not absorbed. Take for instance a polarized lens ...

Some lenses or pucks have tints to them based on their manufactured composition. Polarized lenses may have a gray, brown or a gray-green tint (either warm, cool or neutral) to them already. That is their nature. These colors will, by default, alter the appearance of what a person wearing them sees. It will make the world they look at slightly tinted with a 'kick' of color based on the tint of the lens. What if that customer wanted a mirror-color coating on top? This will further 'alter' the colors of what they are seeing because certain light waves of color will still pass through and mix with the tint of the lens. For example... let's say that you have a customer in your store that chooses a polarized lens in gray. For starters, they are inside, under less-than ideal lighting conditions for viewing glasses that will also be worn outside. This 'gray' will slightly tint what they see through the lens to begin with. If they wanted a blue mirror coating applied on top of a warm-gray polarized lens, there will be a mixing of the warm gray and blue that might actually create a brownish/reddish hue to what is being looked at through the lens. The reason is that although a blue coating was applied, to create 'this' color blue, it only reflects back a small range of the blue that makes up the final color. The rest of the blue in the spectrum passes through and can mix with the gray of the lens. (below)

This, of course, can make a customer very unhappy. Because of the gray of the base lens, which may contain some red and orange in it (warm gray) mixes with the light and the blues 'not' found in the blue coating, producing a completely different color than they were expecting, and chances are, a color result they don't like.

BASICS OF COLOR & LIGHT MESSIN' WITH YOU (simulated example)

ROCK - PAPER - SCISSORS - LIZARD - SPOCK

Bazinga! You just fallen victim to a practical joke of physics and light and colors. Technically, it's not a joke and is actually a result of the physical properties of color and light. To paraphrase Dr. Cooper, 'your problem is not with me, but with basic physics'. Light, color, and filtering is messing with you and your customers and here's why (the point of all of this). Most colors do not reflect a single wavelength, so there is always going to be a mix of subtle colors. As it pertains to colors and the wavelengths they reflect, some colors have 'shared wavelengths' and some don't. A warm yellow (has some orange) and a warm red (has some orange) will share a similar wavelength that produce a nice orange when mixed. A cool yellow (has some green) with a cool red (has some violet) does not share the same wavelengths and will produce a muddy brown (green + violet). This makes it difficult to know the results you may get when coating a tinted lens but now you know why colors can 'go wrong'.

So how can any of this help you? For starters, I'm hoping this article provided you with a few new and different perspectives as it pertains to looking at color. I'm not at all recommending that you immediately change all the colors and lighting in your dispensary upon reading this, but you should look at your showroom environment a little differently now and how it may be affecting the results of what you and your customers see.

Having an understanding of color, light, and causes for the varying appearances of color, should help you better-educate your customers when it comes to their color choices. You can hopefully provide them with some explanation *before* they make their purchase of what can be expected. Having tangible samples of things like tinted lenses with colored mirror coatings will prove to be invaluable when it comes to helping your customers and to see more accurately what they will be getting.

THE TAO OF COLOR

THE ESSENCE OF COLOR HARMONY PRINCIPLES

— Roy G. Biv

the BIG COLOR THEORY

Color theory is simply a way for us to understand and organize colors as a guide to using them in art and design. But what does that mean for you if you are not an artist or a designer? Can having a better understanding of colors, meanings, psychological impacts, lighting etc... really make a difference in your life? In your business? For your customers? Absolutely.

A Holistic Approach

Having a little education can go a long way... and that was really the point of these articles. To provide you with some insight and information that goes beyond the basic understanding of color that the majority of people have.

There are countless resources available online that will provide you with alternative ways of learning about color. I dialed the psychology of color down a little bit to provide more of a holistic approach to seeing the results colors have on us. Focused on some of the technical stuff in the primary Big Color Theory article because of how heavily based it was in physics. I could further dive in to the 'history' of color theory but that might get a little numbing. Rather, I'd like to present you with some of the basics and beyond of the color wheel and how it's used. A cliff note version, if you will.

I will, however, state that color theory is studied by artists, designers, art historians and many more, in order to understand the interactions between colors, the uses of colors, and the scientific properties of colors. It often involves the psychology of colors (not to be confused with symbolism of colors, which is determined culturally) and also involves studying the way that the brain sorts and processes colors that we see. Studying color (and design) is a never-ending process; a lifelong commitment due to trends, pop culture, change in seasons, mood and much more. You don't need to give up your profession to make an impact in your life and for your customers.

Red is not red is not red...

Colors are determined by their relationships with each other. Colors can look like completely different colors depending on where they are, what lighting they are under and even what colors they are next to. Designers factor all of this stuff in when choosing colors.

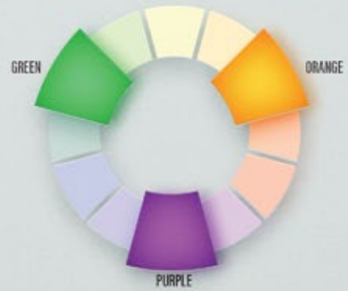
When you ask a designer to make your logo with red, they actually don't understand what you mean right away. The reason being is that red is such a generic label for the color that we've come to understand as 'red'. A well-educated designer will start asking questions about your choice for red and will not accept "because I like it" as a proper choice. Many designers will look for meaning and symbolism behind the logo and spirit of the company to try and better understand why you want red and the 'type of red' you want.

If that conversation went well enough for everyone involved, the meaning behind the purpose of the logo was distilled down to its essence. That helps 'fine-tune' the type of red that is being sought after in the first place. Red, as with all other colors, is much more than a generic label. Red has meaning. Red makes us feel things. You have your cool reds, your warm reds, your neutral reds, dark reds, light reds, tints, and shades... basically millions of variations to cull through and work with. To better understand this, let's begin with the basics of the color wheel and then vary these colors. Finally, we'll wrap it up with some simple color algorithms to see how colors can play nicely with each other, and go from 'drab to fab'.

Primary Colors

RED, YELLOW, BLUE; in our color theory, the three basic colors from which, theoretically, all other colors come.

Secondary Colors



ORANGE, GREEN, PURPLE; the three colors made up of the primaries and situated between and across from them on the color wheel.

Tertiary Colors

Colors made up of primaries and secondaries and situated between them on the color wheel. These also round out our basic color wheel.

Hue

The 'name' of the color (red, blue, yellow...). This is what we use to identify a color and is typicaly a starting point for the process of 'working' and 'fine-tuning' the color. The fine tuning is achieved through things like Tint, Shade, Value, Saturation, Tones and Temperature. These are 'kid-colors'.

Tints

When white is added to a color, you get a tint of that color. Some refer to these as pastel colors as they are lighter and paler than a pure color. Tints range from slightly whiter to an almost-white and are very soothing, fresh and clean. Tints are very soft and pleasing to look at.

Shades

When black is added to a color, you get a shade of that color. These darken and dull the brightness of colors. Shades range from slightly darker to an almost black. Both tints and shades can have more adjustments like saturation to further extend what colors are available.

Value

The lightness or darkness of a pure hue or a shade or tint. It is the relative light and/or dark in a color. This range of light and dark shows you the strength of the color light. If you completely desaturate the colors, you are left with a grayscale representation of those colors which shows you how 'strong' their light emission is.

Saturation

A color mixed with its complement and no white. It is the purity of the color. Saturated colors are very 'wet' like a soaked sponge... full of vividness and richness. Squeeze out the sponge and you desaturate it. Same with color. Desaturation takes the 'sting' out of the color. and makes it softer and gentler to look at.

Tones

When gray (black + white) is added to a color, you create a tone. Toning-down a color reduces the intensity. Adding black and white in different amounts to a color will subdue the intensity quickly. It is a color that is muted by gray. Tones are much more comfortable to 'older eyes'. A box of Big Bran Cereal won't have obnoxious colors.

Temperature of Colors

How warm or cool a color is. Typically determined by where the color is on the wheel. This is regarding a different 'temperature' than the temperature of light. Still, you will need to be mindful and check your colors under the correct lighting conditions.

Cool Colors

Blues, Greens, Purples alone or added to another color or composition to cool it down.

Warm Colors

Reds, Oranges, Yellows alone or added to another color or composition to warm it up.

Complementary Colors

Complementary colors are "opposite" each other on the color wheel, meaning the one color they lack in their composition, is that one that is opposite of them. They create a visual tension because they are so opposed to each other. They make things stand out. You might notice, for example, that some of your favorite sport teams use complementary colors. Opposites do attract.

Split Complementary Colors

If you want to use three colors instead of just two, a split complementary color scheme is a way to add some flair using complementary colors with a third color to your palette. Simply choose one color as your base color, find it's compliment (directly across) and then use the two colors adjacent to its opposite.It offers a little less tension than a complementary color scheme does, but it's still visually exciting for your eye. Very dynamic.

Analogous Colors

Analogous colors sit next to each other on the color wheel. They are "related" and share wavelengths. Think of them as a family of colors that creates pleasing and relaxed visuals. They are a kinder, gentler scheme that isn't jarring or clashing. They also don't stand out from one another. Analogous colors can create subtle and comfortable schemes. Keep in mind that you may need to add a complementary color to get any particular item to stand out. The safe choice.

Monochromatic Colors

Monochromatic colors are simply a single color with tints, shades, and tones. They are even more soft and subtle than analogous colors since it's a color palette based on one single color. If you don't want boredom, consider a complimentary color to 'help it along'. Monochromatic doesn't have to be boring though. It all begins with fine-tuning that initial color. Remember... value, saturation, tints, tones, warm, cool all play a role in the initial color before you monochrome it. Very neutral.

Choosing Better Color Combinations

As you can see, the color wheel can help you choose color combinations for your logo, business, dispensary, home etc... and make an immediate and positive impact. Mentally rotating the locked indicators on the wheels above will allow you to pick/see different color schemes (try it online at **https://color.adobe.com**). Color has meaning, so each color adds or takes away from your message. So make sure you choose the right one... not your favorite color, but the color that is most appropriate. The key is to start simple. Life is like a box of crayons... when you were a child, you likely didn't get the 120 count box, you probably got the 8 pack. The color wheel illustrated in this article is the same as the 8 pack of crayons. Simple, manageable and a great starting place to pick a color. Color is an immediate stimulus for most people and can provide a very cost effective and alternative to a new look for you and your customers.

In the heat and the rain – that's where you typically expect to see rainbows. A nice spring day, a light shower, and a pot of gold hidden off in the distance. Not so much when it comes to your lenses. Anyone that's dealt with lenses long enough has experienced this before – an oil-slick like effect, or rainbow, in the lenses. As this is one of the few places in life where you probably don't want a rainbow, I wanted to address some concerns over it, and see what can be done about it. This also has a few other fancy names, such as "Newton's Rings" and "Chromatic Aberration".

Shame on the Light

So the first question, of course, is 'what causes this?'. It really comes down to the way that light behaves when it moves through materials. Birefringence is the three-dollar-word of the day that explains this. In our corner of the world, this really boils down to a very simple thing. That is, the difference between the refractive index of our lens material and the refractive index of the various coatings on the lens. That's why you tend to see this more on polycarbonate and higher index lenses. Most standard lens coatings come in a refractive around 1.49-1.50, which is similar to basic plastic lenses. This explains why you very infrequently see this on plastic lenses. The closer the refractive index of the coating and the lens, the less likely you are going to be to 'catch the rainbow'. Since it's a phenomenon occurring between lens and hard coating, you don't tend to see it on glass lenses, as they don't need a hard coat, so there's nothing to cause the effect to manifest. So it's not so much an issue of anything being wrong with the lens, and is a product of the physics of light. That means it's not down to the manufacturer, but rather is all light's fault. So, shame on the sun.

Stand up and Shout

It's the first thing that the patient is going to do when they see this. Maybe. It's important to make sure that you and your staff know what this phenomena is so that you can adequately explain it to the patient. You want to make sure that they know what it is, so that way they don't think there's "something wrong" with it. The good thing about birefringence is that it's purely aesthetic – it doesn't impact the functionality or optics of the lens at all. When wearing it, the patient isn't going to be able to detect the color variations, so it's not going to interfere with their vision. Indeed, often times people don't really notice it or see it as out of place. This is because, really, it isn't. It's simply the way that the physics of light work in this situation.

RAINBOW RISING
WORLD TOUR
Coming to a pair of lenses near you

Rainbow in the Dark

How do we minimize this effect? Well, the easiest and most impractical way to fix it is to simply avoid all light. When there's no lighting, the rainbow won't get you down. One interesting and also useless piece of information is that if you have non-white light, you get patterns that are more monochromatic designs instead of the color spectrum produced by white light. However, at this point you probably want some information that's a little more practical and/or useful.

Last in Line

So by the time you've recieved the lenses, they are already done. You're not going to be chanigng the coating process from your office. Basically, as an end-user, there's really not a lot that you can do. Anti-reflective coating can help to lessen the effect, but it's still going to be visible to the discerning patient and professional. It's up to your lab and/or manufacturer, as it's purely a result of the coatings that they use. Since it's a result of the components used in the manufacturing process, that means different manufacturers may produce different results on their materials. For example, manufacturer A may use the same, lower-index coating for all of their lenses. Manufacturer B may use lower-index coatings for their plastic lenses, and higher-index coatings for their polycarbonate and high-index lenses. By using a coating of a higher refractive index on these materials, the rainbow effect will be lessened since the refractive index of the coating and material are closer to each other.

Caught in the Middle

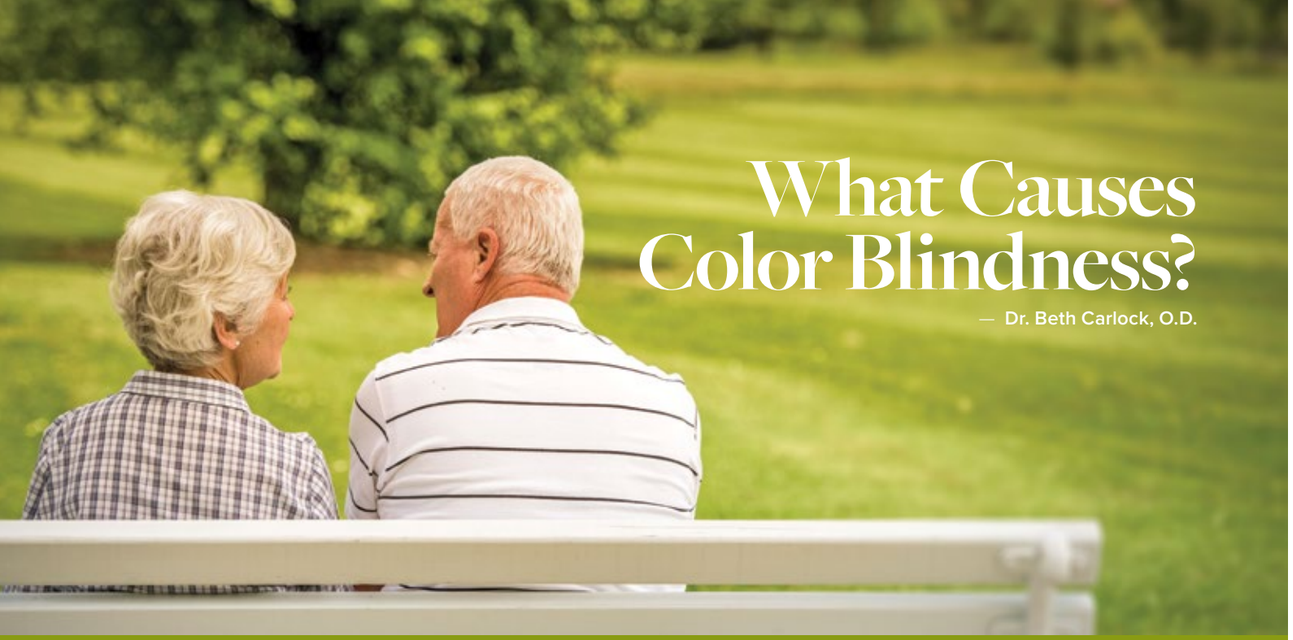
Why don't we just use a higher index coating? A very good question that, of course, has a slightly complicated answer. To answer that we have to look at where the lenses are coated, who's coating them, and the kind of result you get at the end.

In terms of where a lens is coated, it usually doesn't make a difference, until you start to travel outside of the United States. Some manufacturers make their lenses in other countries and then import them into the U.S. This means that they can use some chemicals in their coating process that may be deemed too hazardous to do the same type of coating in the U.S. That's not to say the end product itself is dangerous, rather the large volumes of concentrated liquid required for a coating machine can be too hazardous to produce in the U.S. For example, it's not very easy to even obtain a hard coating that goes above a 1.60 refractive index in the United States, which makes it almost impossible to completely eliminate the rainbow effect on all materials.

Who does the coating can also make a difference. Is the coating being applied by the manufacturer, or by the lab? If it's the manufacturer, it's easier for them to cost-justify having higher index coating available. This is because higher index coating can typically cost 3-4 times as much as standard hard coating. With an increased cost, it's also important to note that when doing a dip-type coating, the batch of hard coating has a life span of about six to eight weeks before needing to be replaced. That's regardless of the number of lenses that have been processed. So the more lenses that are coated, the easier it is to absorb the higher cost. This is why you can sometimes get manufacturer-coated lenses that seem to have less chromatic aberration than those that are coated by an intermediate party.

Quality can also be a concern when you go with a higher-index hard coating. As you increase in index, you can often decrease in scratch resistance. This is often a hard thing to choose between, especially when it comes down to trying to select what's right for the patient. If you have to choose between scratch resistance and cosmetics, which one do you pick? That is largely going to depend on your particular clients, but most people would rather not have those lenses come back for a remake, and people are much more likely to scratch their lenses than they are to have a problem with our rainbow.

— **Ronnie James D.O.** (RIP)



What Causes Color Blindness?

— Dr. Beth Carlock, O.D.

Did you know that color blindness is pretty common? While it affects only a small percentage of women, it affects about one in twelve men. A genetic mutation causes most cases of color blindness. Acquired color vision loss can be caused by eye diseases like macular degeneration, cataracts, glaucoma, and diseases that affect the optic nerve. Genetic color blindness can't be cured, but acquired color vision loss could be reversed or improved if the underlying disease is caught and treated early enough.

How Does Color Vision Work?

The retina lines the inside of the back of the eye. The cells that react to light are cones and rods. There are three types of cones: red, green, and blue. They are named for the color of light they perceive. The cones are concentrated in the macula, which is the part of the retina that gives us our best sight.

There is only one type of rod, and it signals when it receives any type of light. Rods perceive any wavelength of light as white. Cones require a lot of light to function and so they function best in daylight. Rods can signal even low levels of illumination, so they don't need a lot of light to work correctly.

The color signals travel from the eye via the optic nerve and other nerve pathways to the vision center located in the back of the brain. Once there, the brain processes the information so that we perceive the different colors.

The Genetic Color Vision Disorders

The most common genetic color "blindness" is X-linked recessive and affects either the red or green cones. The mutated red or green cone genes are carried only on the X gene and not the Y gene. Women have two X chromosomes, and since the disorder is recessive, if women have one normal X gene, they will not have color blindness. Women have to have the mutation in both X genes to develop color blindness. Since men have only one X gene (the other being a Y gene), if the X gene has the color gene mutation, they will have color blindness. About 1 in 12 men has red-green color blindness while only about 0.5 percent of women suffer from this problem. The color vision defect may be mild, and some people can perceive bright reds and greens but have trouble only with grayed-out versions of these hues, like burgundy or dark evergreen. People with severe red-green color blindness may see red, green and mixes of the two colors as a muddy gray-brown.

Tritanomaly is a condition that affects the blue cones, and it is far more rare. It affects only about 1 in 10,000 people and affects men and women in equal percentages. The gene that codes the blue cones is carried on chromosome 7 rather than on the X gene. It is autosomal dominant, which means that if someone has one copy of the abnormal gene, she or he will have the disease. Patients with this condition have trouble perceiving blues and yellows.

Rod achromatopsia is the least common of the genetic color vision defects, affecting only about 1 in 50,000 people. It is autosomal recessive, meaning that a person needs two copies of the mutated gene to suffer from the disorder. There are a number of different genes that cause this condition, and the mutations can appear on more than one chromosome. People affected by this disease have few or no cones. Since only the rods function, these patients usually suffer from severe light sensitivity.

Acquired Color Vision Disorders

Diseases that affect the lens, optic nerve, retina, or the brain pathways leading from the eye to the vision center in the back of the brain can cause changes in color vision. Some of these conditions include the following:

- **Macular degeneration**
- **Retinal detachment**
- **Diabetic retinopathy**
- **Glaucoma**
- **Multiple sclerosis**
- **Stroke**
- **Brain tumors, benign or malignant**
- **Optic neuritis**
- **Infections in the eye or brain**
- **Genetic retinal diseases that affect the macula or optic nerve**
- **Cataracts**
- **Traumatic brain injuries**

Cataracts can cause changes in color vision perception. As we get older, the lens starts to turn amber and then brown. This reduces the amount of blue light reaching the macula. Patients with severe cataracts often notice that things look dull, and these people may have trouble distinguishing purples, blues, and indigo.

Any damage to the macula can affect color vision. That is because the color vision receptors are concentrated in this part of the retina. Macular degeneration, retinal infections, diabetic eye disease, or any other condition that causes swelling or bleeding in the macula can cause color vision loss. Retinal detachments that happen at or near the macula can also cause varying degrees of color blindness. This loss can be mild or severe depending on how much of the macula is affected.

Since the optic nerve carries all light signals from the eye to the vision centers in the brain, anything that affects the optic nerve can cause changes in color vision. Glaucoma, which causes the nerve cells in the optic nerve to die off, can cause color blindness in the late stages. Optic neuritis and tumors that press on the optic nerve can cause decreased color vision. Multiple sclerosis (MS) sometimes affects color vision because of optic nerve swelling.

Diseases or injuries that affect the brain, particularly the parts of the brain that transmit vision information, can all cause loss of color vision. Strokes, traumatic brain injuries, brain tumors, meningitis, MS, and encephalitis can all alter how patients perceive color.

Genetic retinal diseases, especially those that affect the macula or optic nerve, can cause color blindness in varying degrees. Best's disease, Stargardt's disease, and Leber's optic neuropathy are just a few of the many genetic eye diseases that affect color perception. Fortunately, many of these conditions are extremely rare.

How Do Doctors Diagnose Color Blindness?

Many people, especially children, don't realize they have a color vision problem. Usually, this is because these patients have never seen color in any other way and don't know what they're missing. There are a number of color vision tests that optometrists use to diagnose color blindness. The most common one is the Ishihara color plate test, where patients have to identify a colored number in the center of a circle. This test is usually limited to testing for red and green color vision loss.

To test for tritanomaly or achromatopsia, doctors need to use tests that check all three cones. The Farnsworth D-15 and D-100 tests, as well as the RGB anomaloscope, can be utilized for this. Examples of these tests are located on various websites including the Colblindor site.

Everyone Should Be Tested for Color Blindness

Some doctors check only males or children for color blindness when in fact every person should be evaluated regularly for changes in color vision. One of my patients was a man in his 20s who was a journeyman electrician and had never been told he had red-green color blindness! No one had tested his color vision at any of his previous eye exams. Since his color vision defect was very mild, he had no difficulty performing his job unless he was in very low light settings. However, had he known about his mild color blindness, he might have chosen another occupation that didn't involve differentiating between green and red wires.

Even if color vision problems are rare in women, they do occur, and many women have never been informed that they have color blindness. I have had six female patients in my career who have had genetic red-green color blindness. Only one had undergone a color vision test before I performed it with her. While it is rare, it is important for women to know if this is a gene they could pass on to their children. People with red-green color vision problems need to be aware that they could have children who either have color blindness or are carriers for the condition.

Anyone who notices altered color vision needs to see an eye doctor right away. Diseases like optic neuritis, retinal detachments, and retinal bleeding from macular degeneration or diabetic retinopathy need to be diagnosed as quickly as possible to prevent permanent damage. Diagnosing these diseases within a day or two of onset may mean the difference between temporary color vision loss and severe, permanent vision loss in extreme cases. Every patient also should be screened for genetic color blindness during routine eye exams so that he or she can be offered genetic counseling.

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ENDLESS NIGHT

THE TROUBLE WITH BIG T

— Dan Dade, Private Optician

IT was a warm and sunny afternoon. I sat behind my desk, taking a long draw on a freshly-filled electronic cigarette. There wasn't much going on today – hardly a customer all week, come to think of it. I was a loner, an independent. I played by my own rules, and sometimes that kept clients away. I looked up as the door chime jingled – and there she was. Out of all the optical joints in all the towns in all the world, she walks into mine. Those red lips were the first thing I noticed about her. Really stood out against my drab office décor. The next thing I noticed were her eyes, they....well... they were hard to see, really. Her lenses were still dark from the sun outside, so I couldn't really tell what color her eyes were.

She stumbled a bit, her eyes trying to adjust to the din of the office. She shuffled forward, shifting her glasses down her nose to peer at me from across the room. "I suppose you know why I'm here," she said, taking a few long, slow steps towards my desk.

Sure, I knew. She wasn't the first one to come here. I've had more and more clients unhappy with how slow their photochromic lenses are. Sure, they may seem great outside, but as soon as you go inside? Forget about it. Nothing. Darkness for what seems like forever. By the time they get light again, you're just about ready to head back outside anyway. I nodded to the chair in front of me, "Have a seat."

She had given up on the still-darkened lenses at this point, tossing them lightly on my desk as she sat across from me. They were a steel blue, by the way. Her eyes, that is. If you were still wondering. "You know, they said I should have come to you first," she sighed, looking down at the discarded glasses on the desk, then back at me, "seems like they were right." I leaned back slightly in my chair and cracked a small smile, "Tell me what happened, from the beginning."

"I wanted to get lenses that go from light to dark – how hard should that be? I figured I'd get a better deal if I went to one of the big guys. They're everywhere, you know?". Yeah, I knew, but I wasn't about to stop her. It almost sounded like a combination of a confession and an apology, without really being either. "So I went....I went down to see Big T," she continued, sounding like she just admitted to kicking a kitten.

Now, I knew Big T. Biggest player in the game - he had his product everywhere. People used it and came back for more. Poor people just don't know any better. They don't want to know. They just buy what they're told, and behave like good little boys and girls. There's plenty of other players in the photochromic market, but nobody's got the muscle that Big T has. Problem up until recently was that there wasn't a whole lot of difference between what Big T was pushing and what everyone else had. Some of their colors were a little different, sure. Some were blue-gray, some were brown-gray, and a few end up in between. Other than that, they mostly work the same. You go outside, they get dark. Go inside, they get lighter. Eventually. Not really anything new here. Not until now, that is. What I've got is going to knock her socks off, but I have to let her get there on her own first.

She continued, "So I got these glasses and...,"she looked down at the pair on the table, and gestured to them dismissively, "they just stay dark for so long. I come back inside, and I can't see. What's the point? How are these even useful? And for what they cost?" She seemed like she was starting to get worked up, so I pulled a bottle from my bottom desk drawer. I poured into a couple of glasses and offered her one, she took it and sipped the water delicately. "I'm sorry about that. Thank you," she said, taking a deep breath to compose herself. "Don't you have anything that can help me? I just want something that is going to work the way that I want it to work. Something that's going to actually be useful, and not just make things more difficult all the time."

I flicked some imaginary ash off the end of my e-cigarette, then tossed it in my desk drawer. I pulled out a pamphlet and tossed it on the table. She looked down at it, then back up at me. "What's **nuanceRT**™?", she asked, picking the pamphlet up off the desk. I leaned forward in my chair to rest my elbows on the desk. I'd been waiting to say this since she came in, and now it was time. "It's just about the best damn thing since sliced bread, sweetheart." She looked up from the brochure, somewhat incredulously. I continued

before she could get a word in. “Imagine this – something that gets lighter in half the time, or even faster. Would that be better for you? You can still get the darkness outside you want, but a hell of a lot better performance getting clear again. Why, if you had them now, you’d be able to see without tossing those on the desk,” I nodded towards the pair of frames that were still sitting on my desk, their lenses nowhere near clear enough yet.

“Come on darling, do you really expect me to believe this flimflam?” she scoffed, tossing the brochure back down on the table. “If it was really that good, how come Big T don’t have it?”, she crossed her arms and sat back, giving me one of those grins. You know the kind – filled with self-satisfaction and smugness. I’m going to enjoy watching that melt away.

“Well honey,” I tossed a lens across the desk, “you can try it for yourself if you don’t believe me. But let me ask you this: Why would Big T need this? He’s got plenty of people eating out of his hand already. He can just come out with something a little different every few years, and everyone is happy. Especially Big T, since he gets to use it as an excuse to jack up prices.” She looked at the lens in front of her, unsure of what to do with it. “Go take it outside, then come back in. I can wait.” I leaned back in my chair, raising my arms to rest my hands behind my head. She paused a moment, then walked outside with the lens, her glasses still sitting on the corner of my desk.

“Okay, it’s dark, so what?” she tossed the now-darkened lens back on to my desk. “About as dark as you’re used to?” I asked, trying to sound like I didn’t already know the answer. “Well, yes, but...” she began, but I didn’t let her finish. “So it’s just about as dark as what you get from Big T. Great. And how’s it look now?” I gestured down towards the lens on the desk. It took her a moment, but she did a double take between that lens and the frame she had tossed down minutes earlier. “It’s just about as light as what I got from Big T... but...that one from Big T has been in here a lot longer. This other one...this **nuanceRT**™ lens...it’s only been inside less than a minute and I can already see it’s changed a lot.”

It’s really rewarding when the shoe drops. When they finally get it. Then I just get to bask there in that glorious feeling of helping someone realize how things actually are in the world. Just because the big guy on the block is fat and happy taking your money doesn’t mean he’s going to be giving you the best products. I’ll admit, having them say they were wrong feels pretty good, too, but I usually don’t bring that part up. She seemed a little bewildered. “So, they have to be really expensive, right?” She almost sounded hopeful. Her expression change as I shook my head. “I want a pair of these, in that case,” she said, picking the now-clear lens up off the table and handing it to me.

Now, this is the part of the job that I love the most. Not the getting paid part – though, that part is pretty good – but the helping people out part. She came in with a problem, and I fixed it. Not only that, I gave her a reason to come back. Hopefully a reason to get other people in here, too. As she turned to walk out of the office, she paused and turned back towards me. She took a step towards me and picked up her original pair of glasses. “Look at that,” she said, holding them up, “they’re finally clear.”

MANAGING SUCCESS IN A PRACTICE MANAGEMENT WORLD...

Much has changed in the last few years in how a practice operates. Gone are the days of patients simply paying for services rendered and products purchased. Now the modern ECP must navigate a complex system of charts, categories, costs, rules, and limitations on services based on whatever provider a patient may have. For sure, the good ol' days are gone. Or are they?

Has managed care eaten into your profitability? Did you need to hire more staff or pay more fees to make claims? There are a few solutions to bring the control back to your practice and while it may be scary, if you run the numbers you can see that by the end of the year, your practice can be more profitable, peaceful, and simpler.

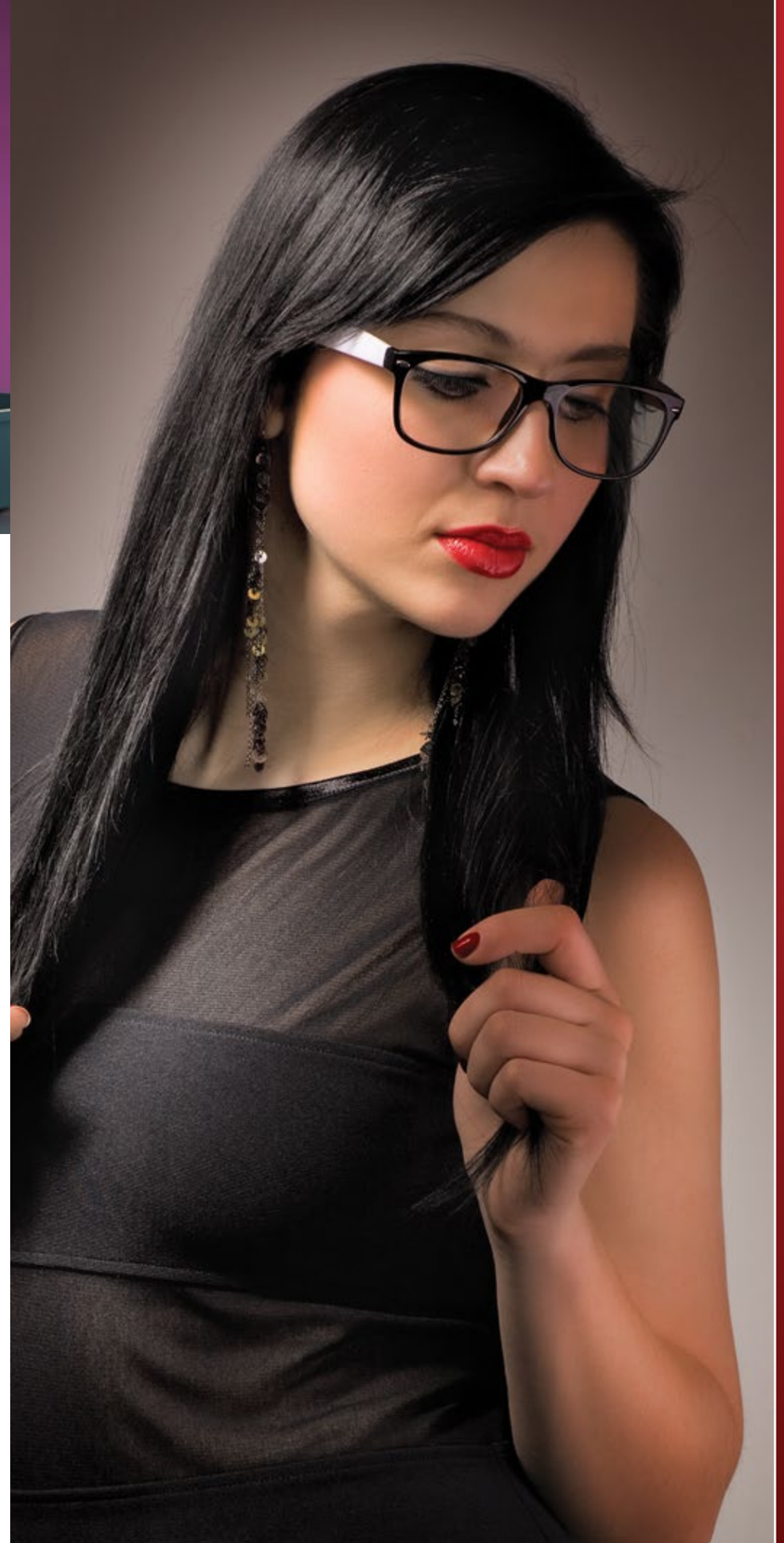
Let's begin with the obvious, **stop taking managed care plans**. Crazy, you may think but with the decreasing reimbursements and the additional costs to file a claim, you can be more profitable seeing less patients, and get the reputation of providing top notch service because you're not trying to cram in an exam every 15 minutes just to keep the lights on. Look at programs that can have you provide your insured patients with the proper forms for them to file on their own, and offer to reduce their fee charged to you to help mitigate the costs. Combine this with a strong community relations efforts (like free vision screenings at local art fairs, or schools/Universities) and your practice will become the go to place for good quality, community conscientious care. You will see fewer patients, but you'll come out ahead because the costs are more straight forward.

Another answer is increasing the number of **second pair sales**. The number of people buying multiple pair of glasses is fairly small, and if you don't believe me look at your own dispensaries numbers. With the constant threat of UV light, macular degeneration and a myriad of other conditions we are seeing in folks who do not properly protect their eyes, prescribe two pair of eye wear? There is medical precedent to require multiple Rx's to treat a medical condition, eye care is no different. Write a prescription for sun wear, occupational lenses, and clear glasses. Managed care covers one pair, the remainder are given with a discount, but the key to this plan is using the insurance coverage on the sunglasses. This ensures the patient also gets at least one additional pair of daily wear glasses. There is nothing wrong with providing patients with a wide array of eyewear to meet their specific needs, in fact you're doing a disservice to them by not ensuring they are getting the best correction no matter their situation.

A third solution is **getting aggressive in practice marketing**, while sending out mailers, commercials, etc. are costly, they can also bring results. Disadvantages to this idea are the high costs. Expect to spend as high as the 6 figures depending on the size and strength of campaign you put in place but you can drive more patients to your practice and make up your lost profitability on a large influx of patients, but be prepared to need to hire additional resources (Doctors and Opticians) if your campaign exceeds your current capacity.

Your practice can not only survive but thrive in this new world of managed care, but it will require you to adapt with the changing landscape of how our industry is developing. For more individual support or consulting help, reach out to your independent lab for help, in many cases they have resources to help you or can point you in the right direction.

— Puss N' Boots



DAILY
Soft Contact Lenses 2016

— Jason Smith,O.D.,M.S.

I have seen the soft contact lens market accelerate in exciting ways over the past 20 years. Companies are trying to stay ahead of what patients want and for the most part, they have been doing an excellent job. Soft contact lenses that have out-performed their usefulness have been discontinued. Companies are changing their names such as Ciba Vision, now Alcon, and Vistakon, now Johnson and Johnson Vision Care. 1-day contact lenses are becoming more numerous and more available in spheres, torics and multifocals.

One Day at a Time

There are now 1-day colored contact lenses available. Because these lenses can only be worn one time, there is less of a chance that a patient will over-wear their contact lenses causing irritation and the potential for infections. Patients should never sleep in 1-day contact lenses, so the risk of over-wear is also eliminated. Since a contact lens case is no longer needed, there is no chance that a contaminated case can be a source of infection. No solutions are necessary for 1-day use, so "topping-off" a case is eliminated. And those patients that have solution sensitivities or allergies to these products no longer have this problem. There are many patients who still like to wear their glasses most of the time. But they may have social events, occupational requirements, or sports activities where a daily soft lens may be necessary or appropriate. There are some patients who are wearing soft contact lenses who believe that soft contact lens solutions and saline are the same. Some patients mistakenly use saline to clean or to store their lenses which is never appropriate. Saline can be used as a rinse, if needed, but should never be used in conjunction with cleaning, disinfecting, or storing any contact lens. This problem will also be eliminated with 1-day soft contact lenses. The costs of solutions are also eliminated.

Examination & Education

Any patient who is considering contact lenses must have a complete eye examination and contact lens evaluation. All aspects of eye health must be evaluated. Any dry eye conditions, corneal irregularities, irregular astigmatism, amblyopia, retinal problems, or any eye diseases must be considered before any patient can become a successful contact lens wearer. Patients must be educated concerning insertion, removal, wearing schedule, emergency procedures, and realistic expectations. Contact lens training and education will involve direct explanations when educating a first-time contact lens patient as to how to insert and remove a contact lens. Numerous websites and on-line videos can enhance this educational process and handouts to be read at home may be something to be considered. Patients should be provided trial lenses during this learning process. Patients should be advised to put their lenses on at home initially until they become comfortable with the process. Schedules must be adjusted for the working person, the young adult who is in school, or the person who has an at-risk job. Case histories will disclose if a patient should be wearing contact lenses in a risky work environment. Dusty environments may not be the ideal place for someone to be wearing any contact lens. And those patients who are operating machinery, using chemicals, operating heavy equipment, or using power tools or mechanical equipment must always be advised to protect their eyes with safety glasses, safety lenses, and a safety frame. A thorough case history should always include the question, "are you doing anything risky at work or at home and do you have any hobbies or participate in any sports that may place the safety of your eyes at risk?" Many people may have day jobs where there are no risks during the day. These same people then come home to work on their sports car, go to a boxing class, soccer match, or play basketball that may place their eyes at risk. And during the warmer months of the year, many patients forget to protect their eyes from weed trimmers or lawn mowers.

Written instructions and phone numbers in case of an emergency should always be provided to a new contact lens patient. Parents must be informed at all times of the costs, risks, and benefits of contact lenses. And a final follow-up should be scheduled whenever the ECP feels it is appropriate. Contact lens prescriptions must be provided to a patient by law. If the patient is experiencing presbyopic symptoms, then a daily multifocal may be a good option. All costs, risks, and benefits should be discussed with the patient so that there is a realistic understanding of the facts. If patients have a vision insurance plan, they should know what is paid for and what is not paid for. As an example, some plans will pay for a "fitting" fee, some plans will not. Some plans cover certain types of contact lenses, but not daily contact lenses. Some plans do not cover contact lenses at all and only provide glasses to a patient.

Staying Up to Speed

In order for ECP's to keep up-to-date concerning contact lenses and contact lens products, Tyler's Quarterly is an excellent source of information. Their website is located at http://tylersq.com/orderform.htm where you can find out about subscription information. Or check each contact lens company's website to see if the product you need is available. Many of these companies including Cooper Vision have on-line ordering available. Every company that manufactures contact lenses is listed in Tyler's Quarterly. All fitting parameters and contact lens characteristics are provided for every contact lens including base curves, diameters, material, water content, FDA#, Dk values, unit costs, sphere and cylinder powers, available axis, optical zones, center thickness, toric markings, and disinfection methods. There are a number of comapnies that manufacture one-day contact lenses, some of the major ones include: Alcon, Bausch and Lomb, Clearlab, Cooper Vision, Johnson and Johnson Vision Care, Optical Connection, The Preferred Vision Group, and Unilens Corporation. Each of these manufacturers has at least one, and most of them have multiple different lens options to choose from. Some of those options include high astigmatism lenses, U.V. lenses, and more. In general, the products are similar from company to company. However, they tend to vary in their base curves and diameters, which helps when trying to get a perfect fit on a patient. If one vendor is a little too 'tight' on the eye, another vendor may be perfect. Of course, once I find the best lens for the patient, I give them at least a week to try the lenses to make sure they are happy and understand the wearing schedule, as well as the do's and don'ts of the lenses.

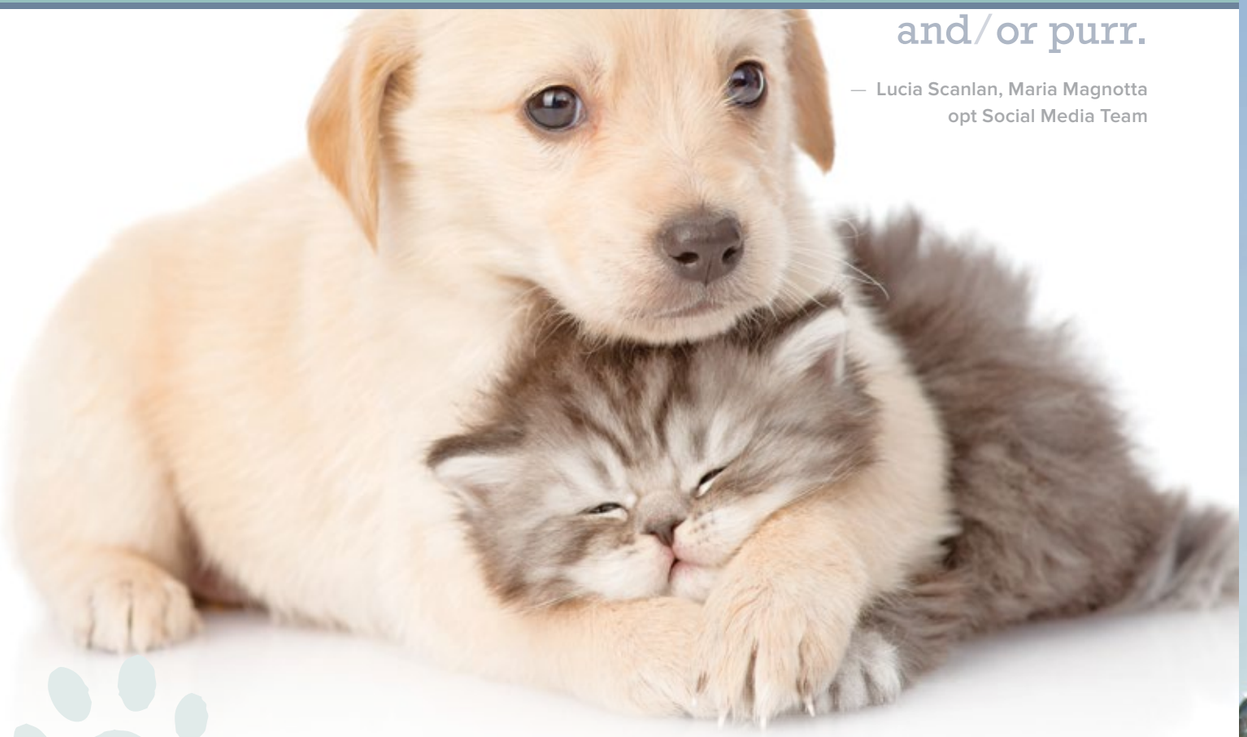
As the demand for daily lenses continues to increase, the supply from these companies and from others will also increase. For those patients who need toric lenses, the cylinder powers are readily available. Unfortunately, not all axis are available yet, including many of the oblique axis. But I would expect this to improve in the future. New products will be introduced in the future and it will be important for all ECPs to review their journals for updates. ECP journals such as Contact Lens Spectrum have always been a good source of current and updated information that is available on-line as well as in a printed edition that can be mailed to your office.

Indirect Benefits

Keep in mind that the idea here is not to improve your bottom line with lens sales. There's little to no direct financial incentive to this - you're not going to make much more money by offering these. The point here is to provide increased patient satisfaction, which can in turn have a number of intangible benefits. Since daily contacts can help to reduce a number of common risks, you're going to have to deal with fewer problems resulting from lens overuse. This includes a lower possibility of contamination and infection from using old cases, as well as completely eliminating problems from lens solutions, since there aren't any. It's a win-win for both you and your patient. They don't need to buy solutions or lens cases, and you have fewer problems. When there are fewer problems, you're more likely to get positive referrals, and spend far less time troubleshooting and dealing with an unhappy patient.

Paws n Claws is Something to Bark about... and/or purr.

— Lucia Scanlan, Maria Magnotta
opt Social Media Team



We are big animal lovers here at opt magazine so we couldn't help but highlight the fantastic work of Paws "n" Claws Eyewear. The brand produces unique eyewear exclusively designed to raise awareness and funds for animal charities across the nation.

Eye Deals Eyewear President, Samual Shapiro, founded Paws "N" Claws Eyewear in 2011 to honor he and his wife's love for animals. The avid animal supporters donate 5% of the purchase price to the ASPCA.

Paws "n" Claws offers a wide range of sunglasses and frames to suit any dog lovers style. Each pair is subtly embellished with canine inspired designs, including paw prints and bones, offering a fashionable and fun way to support a great cause.

Additionally, you can also receive a free Signature Picture Window Case, perfect for inserting a cherished photograph of your pet, with every purchase.

Paws "N" Claws is continuously searching for new ways to help animals in need. Recently it announced it's new partnership with Brand Ambassador Stephanie Mattera and the Alliance for NYC's Animals, Taking Animal Rescue Efforts to New Heights. Mattera's ongoing involvement with the Alliance for NYC's Animals and her love for fashion and social media made her a perfect fit for the brand.

In honor of welcoming Stephanie Mattera, the well-known animal activist and socialite, into the Paws N Claws family, it will be donating an additional 5% to the Mayor's Alliance for NYC's Animals from sales using code SAM5, starting on May 5, 2016. This is on top of the 5% from each sale that Paws N Claws already donates, and will continue to donate, to the ASPCA.

The influence of this potential partnership could mean big growth for Paws N Claws Eyewear, benefiting not only animals through the Alliance and the ASPCA, but also giving animal lovers a new way to give back to their favorite furry friends.

To learn more about **Paws N Claws Eyewear** and how they proudly support a mission to save the lives of animals, please visit their website at **www.pawsnclawseyewear.com**

Paws n Claws™ EYEWEAR

Hashtag This

Instagram & EyeCare

— Dr. Arian Fartash, O.D.

Instagram has over 400 Million active monthly users...

and of those users, 12 Million are in the United States. This makes Instagram a great tool for promoting and marketing your business to the masses. It is a free platform for businesses to showcase their products and services through visual storytelling. By celebrating your brand and being consistent with your business theme, ie. glasses, eye care, eyes, the goal is to gain as many followers as possible in order to build your business.

Your content should draw people in and keep them wanting more. Sooner or later you will notice more and more patients walking through your door because they saw your captivating Instagram page. On the next page, you will find three main keys to finding success with your Instagram page:

Describe the picture/post in keywords that describes what is being seen. #sunglasses is a good start with this background picture but you can also this with #hiking, #mountains for example.

#1 POST RELEVANT AND COMPELLING CONTENT

Instagram is all about the visuals, with that said, you will want to post the best quality photos. Those that are simple and clean and will catch the attention of those scrolling through Instagram. I suggest staying away from posting family photos or photos unrelated to your business brand. You will never be short of images, as your office has a plethora of photo content... your frame stock! When you do so, you should also tag the frame brand, because you more than likely will be reposted and gain exposure.

Another way to gain brand recognition is to add your business logo or name to your photos as well. This way your content will be visually related back to your business.

#hashtag
#rules

By adding your business logo, when another page shares your photo, your brand will be present and those followers can then go to your page if they like what they see and want to see more. The more exposure the better to build your business brand. Reposting is a great way to gain followers as well. By posting a photo that is relevant to your brand from another source, ie. frame company, another optometry office,etc., you can gain attention from their followers as well because they exhibit the same interests. Soon you will find yourself building a close knit Instagram network where you will build relationships with others from around the world that have similar interests as your business brand.

#2 USING RELEVANT HASHTAGS TO YOUR ADVANTAGE.

To attract followers, it is important to use **#hashtags** on your photos. A hashtag is a word or phrase that is proceeded by a **#** symbol. They are used in Instagram to find photos that pertain to that particular word. Hashtags not only provide effective ways for your business to network and interact, but to share information to a much wider audience than those who already follow you.

A hashtag allows those who have similar interests to find your photos, which can lead them to your Instagram page and ultimately to your business. You can use up to **30 hashtags per photo** and the best way to save time is to have them prepopulated and saved in your "notes" app of your phone. This way you can cut and paste into your comments section. Some examples of hashtags related to Optometry are **#glasses**, **#frames**, **#sunglasses**, and **#optometrist**.

Hashtags are not only used to attract followers, but also for you to find Instagram pages to build a network with.

RELEVANT CONTENT	USE IT EVERYWHERE	MAKE-IT MAKE SENSE
RESEARCH FACTS	DON'T JUST 'TAG' THE OBVIOUS	BE CONSISTENT
NOT 'JUST' THE BRAND NAME	MAKE IT MEMORABLE	KEEP IT SHORT & SWEET

#3 LIKE AND COMMENT

Most times by exploring relevant hashtags you will come across people or businesses who share a love for similar things your brand is all about. Playing an active role within your network and community liking and commenting will get you noticed. By doing this you will make your presence known and most times, those pages will show you love back. Remember, the more exposure you have on Instagram, the more relevant you will become and more followers you will gain. The more followers you gain, the more business it will attract.

In conclusion, by creating an Instagram account for your business you will be able to connect with new patients. While scrolling through the feed, future patients can see your posts and interact with you even before they walk into your office door. By using the tools discussed to attract followers, you are able to use zero of your marketing dollars to grow your business and create a dialogue with millions. I am excited to see the new Optometric offices on Instagram and invite them to be friends. You can follow me **@glamoptometrist** and feel free to ask any questions you may have.

THROUGH THE EYES OF A DONUT *(Additional forms of social media briefly explained)*

TWITTER: I'm eating a #donut
FACEBOOK: I like donuts
FOURSQUARE: This is where I eat donuts
INSTAGRAM: Here's a vintage photo of my donuts
YOUTUBE: Watch me eat donuts
LINKEDIN: My skills include donut eating
PINTEREST: Here's a donut recipe
SPOTIFY: I'm listening to donuts

"IT'S TIME TO SEE YOUR DENTIST"

— Tom Bowman

For most all practice owners, the largest challenge is getting consumers in your door or, as many refer to it, as 'getting butts in the chair'. The process for this challenge is creating and following an articulate marketing calendar of events. However, rarely is there a plan laid out to create patient loyalty in order for them to return to your practice.

I worked for thirteen years in assorted optometric practices, and later became a practice owner myself for another thirteen years, before getting into optometric practice consulting. I used to think in the early stages that giving a patient a thorough eye health examination, good quality eyewear and/or contact lenses at a fair price along with a smile on our face would guarantee patient loyalty. It didn't take long before I realized that we were only guaranteeing patient satisfaction...not patient loyalty.

As time goes on, you may end up with many satisfied patients, but very few loyal patients. Loyal patients will refer you to all their friends, relatives, co-workers, and even their neighbors. Loyal patients will stand beside you even if their vision insurance plan were to change. Loyal patients will still go to you for their eyecare even if they moved across town, or even if they moved across the country like I did!

Let's take a look at creating patient loyalty in a totally different perspective (my dentist) just to prove that you can take pearls of wisdom from many other industries and place these same strategies into your optometric practice in order to create true patient loyalty.

I want to tell you a story about the best dentist in the United States. He's located in Lincoln, NE (where I used to live) and his name is Bruce.

Bruce is the best dentist simply because I perceive him to be the best dentist. Is he in reality the best dentist in the United States? Probably not. Is he the best dentist in my perception? Absolutely so! I moved to a suburb of Phoenix, AZ not too long ago, and do I still go to Bruce? Absolutely!

OK...I'll also visit friends and family when I go back, but I also make sure to secure an appointment with Bruce to get my dental work done while I'm there.

In other words, Bruce will always be my dentist simply because he's the best...in my perception.

So how did this perception come about?

When I arrived at his office for the very first time, the front desk staff were very friendly and attentive. They told me "In order for Dr. 'C' to do the best job possible for you today, he asks that you complete this medical information form". They didn't call it 'paperwork'.

A staff member then took some initial X-rays and informed me that "These will be instrumental to the doctor and all of the technicians throughout your lifetime with us here at Family Dental".

In other words, she helped me understand that this wasn't going to be a one-time visit, but that they wanted me there throughout my lifetime.

The doctor encounter was nothing shy of amazing, as he first welcomed me to their office. Notice he said their office...not his office as if each one of the staff also had a 'stake' in the success of the office.

He also mentioned: "If you have any questions throughout the examination process, please don't hesitate to ask".

He dawned a surgical mask and went to work (*which he later confessed the mask was for his benefit from the patient's bad breath as much as it was for the patient's perception that he was a real 'doctor'*), but as he went to work, he did something that no dentist ever did before. He continued to speak about my teeth throughout the entire examination and also throughout the treatments I required, where my previous dentists typically remained silent.

After multiple visits with Bruce, I now know more about dentistry than I ever had before! Is this a big deal? No...this is a HUGE deal and it gives me the confidence that I chose the right dentist. As he continues speaking, he would mention how important it is to 'nip things in the bud' before they manifest into something larger (and more expensive), and he also mentioned something I have never heard of from a dentist...he said: "Tom, I know you don't smoke or chew tobacco, but when I grab your tongue and look around inside your mouth...I'm actually looking for the very first signs of oral cancer".

ORAL CANCER? I never even knew there was such a thing as oral cancer!

Do I take my dentists recommendation of coming in every six months now? Absolutely!

Looking at my 'Welcome to the Office form', he said "Tom, before you leave today, there are several things you brought up on your Welcome form that I would like to quickly review with you...it says here that you have always been concerned that your teeth aren't as white as you wish they were". He then gave me a huge grin, only to reveal that his 'uppers' were white, bright, and shiny, but his 'lowers' were just like mine...nothing to write home about. He purposely whitens just his 'uppers' to demonstrate the dramatic difference to each of his patients who have similar concerns.

He then discussed that having trays that were custom made to my exact specifications along with the right whitening product can make a world of difference from over the counter whiteners, and that if I wasn't impressed with the results, he would even give me my money back.

Did I try it? Absolutely! Was I happy he brought it up and made the recommendation? Absolutely! As a matter of fact, that's what I actually paid for...an examination, the treatments I needed, and his recommendations on how to enhance my quality of life.

After being asked if I had any further questions, he said "Tom...I hope you like what we have done for you so far today, and if that's the case, don't keep me the best-kept secret...I would love to help your family, your friends, your co-workers, and even your neighbors".

Guess what I did? I told everyone I knew regardless if they needed immediate dental care or not.

Do you think I'm the only one he treated this way and asked for referrals in this fashion? No way! I'm confident he did a similar routine to each and every adult patient who sat in his chair. After several years had passed, Bruce profusely thanked me for all the referrals, but he also asked me to stop referring others to him. In his own words: "I couldn't squeeze in another patient if I had to, and we're not accepting any new patients at this time". Nice problem to have, right?

By the time I was finished and back at the front desk, I was more than happy to pull out my billfold and make the payment for today's services as well as setting up an appointment for my next visit.

What's the purpose of telling you this true-life experience? To encourage each and every one of you to analyze each and every paragraph above and ask yourself "How can I adapt these same strategies into my eyecare practice?"

Loyal patients don't care if a minor problem arises down the road, they have more trust in your recommendations, your marketing costs decline, your employees have more pride in their work, and loyal patients help your practice grow exponentially.

Strategies for building patient loyalty need to be introduced into every practice, especially with social media where both the good word and the bad word could spread like wildfire!

It's up to you to determine what your patients will hear from you and if you turn your satisfied patients into loyal patients.

WARNING!

smiles are contagious

infect as many people as you can

UPike-Hambley Building
Architectural render from Ayers Saint Gross & Trivers Associates

In continuing our look at schools of optometry across the country, we wanted to take a look at the newest one – the Kentucky College of Optometry (KYCO), located at the University of Pikeville. Since they don't actually have any students yet, as their first class begins this fall, I spoke with Dr. Andrew Buzzelli, the Founding Dean of KYCO.

Q: So, Dr. Buzzelli, why open a new school of optometry? Why at Pikeville University?

A new school was proposed in the Central Appalachia region to address several needs in the area. KYCO was envisioned as an access school. An access school serves multiple missions. As always, a college of Optometry will provide a quality professional clinical education for the adult learners who choose Optometry as their vocation in life. KYCO serves besides this mission, the mission of access; access to quality vision care in rural America particularly Appalachia. Medicine has long had the concept of rural medicine. We do have optometrists who practice rurally but as a specialty within the profession of Optometry, it is not a well-established area of clinical care. Rural is defined not in terms of a location but in terms of a population which is underserved and, in many areas, completely unserved. A look at the recent statistical analysis by the Center for Disease Control shows that this area is among the highest areas of blindness due to secondary factors such as diabetes and hypertension in the country. In fact, Owsley County near the College is the county with the most reported incidence of blindness in America.

It is also termed a school of access because it is our job to provide a professional education to students who are not often exposed to the idea of postgraduate professional education. These individuals live in an environment which in years past has been handicapped in the ability to provide even undergraduate educational opportunities. This is recognized in the fact that much of the schools funding comes through the Department of Agriculture in rural funding grants. The college has been referred to in local publications and broadcast media as a "Vision of Hope" for central Appalachia and all of rural America.

Q: Is there anything that makes KYCO different from other optometry schools?

KYCO will have several distinct areas of academic and clinical abilities. The biggest opportunity will be that the college is designed to take advantage of the expanded scope of practice that has been gained by the Optometrists of Kentucky and the Kentucky Optometric Board of Examiners. Our Optometric students will be trained in primary care, laser procedures and other primary care periocular procedures as a significant part of their curriculum.

They will have three separate credit courses devoted to the science and clinical protocols for surgical treatment of specific ocular abnormalities. This will be joined together with the clinical performance of these procedures as a routine portion of their clinical training.

The main clinical treatment programs will be in Pikeville Medical Center, as opposed to more traditional academic clinical settings. The students will also be performing work at three federally qualified health centers (FQHC). These areas have populations of patients which had no access to vision care previous to their agreements with the University of Pikeville. Our graduates will be well trained not only in the primary care diagnostic and treatment protocols of an Optometric Physician but will also be well trained and experienced in the ocular surgical procedures permitted by the Kentucky Board of Optometric Examiners. They will have a significant number of patient encounters for surgical treatment which they will perform under close faculty supervision.

The second arena which will be new to the learners at KYCO will be their exposure to the world of virtual reality in education. Their basic sciences, gross anatomy and neuroanatomy as a start, will have laboratories whose presentation will be all through virtual reality. Gross anatomy dissection, neuroanatomy presentation, and classroom presentations of ocular anatomy will present lifelike 3-D human replicas for the students to work on. These virtual laboratories were recently selected to upgrade education at leading Medical Colleges in the United States. Harvard University, Cornell University, The University of Chicago, University of Iowa and Arizona State University have all switched to virtual reality pedagogies in their medical school's basic science programs. Virtual reality now can provide real life clinical training in a laboratory environment. This will be coupled with the new advances in virtual reality in ocular examination and diagnosis of the patient which have been currently made available through VR Magic. The students will be exposed to a variety of basic and advanced complicated ocular diseases on a 24 hour 7 day a week basis at self-paced virtual laboratories. The college is differentiated clearly not only by the Optometry curriculum of the future but also the educational technology of the future.

Q: How do you prepare your students to enter in to the 'real-world', in terms of non-clinical skills?

KYCO is a state of the art academic facility in a new $55 million dollar facility which includes more than $9 million dollars in advanced educational and Optometric training equipment. This includes all the necessary surgical facilities to train the Optometrist of the future. Because we are an access school, we will provide adequate training in business skills together with our industry partners, the experts in this area.

If we go back again and look at the fact that we are an access school, we will see that we have a very different thrust on where we expect our students to practice. Our students take specialized personal development courses along with their optometric courses to prepare for what we expect of the graduate who serves. The students take courses in not only professional development - where normal practice management is covered - but they have a significant number of course hours in diversity, interprofessional collaboration, Appalachian culture, and personal development as a professional and, most importantly, leadership.

We prepare our students to practice in the rapidly changing landscape of health care. They work from their earliest clinical trainings in a hospital center. They spend many hours in Federally Qualified Health Centers learning about the potential models of collaborative healthcare, which are a large part of the future of healthcare. They will employ new technology and new business skills by employing the leadership skills and dedication to underserved populations which are expected of each of our graduates. They will spend two semesters of actual classroom instruction and laboratories learning what it takes to become a doctor dedicated to service in rural America.

UPike-Sycamore Lobby
Architectural render from Ayers Saint Gross & Trivers Associates

THE KENTUCKY COLLEGE OF OPTOMETRY MISSION

We are practitioners of the healing arts defining the standard for excellence in optometric education and vision care. Our graduates apply their unparalleled knowledge of clinical care and vision science in a cultural environment of faith, social justice and human dignity of Appalachia and rural America.

UNIVERSITY OF PIKEVILLE
KENTUCKY COLLEGE OF OPTOMETRY

Q: How do you see the influx of new students? Are you getting more or fewer than expected? From your role as an educator, do you see interest in optometry growing or declining?

The question about new students and overpopulating the profession of optometry is one that I have answered hundreds of times in the last year and a half. I have answered it many times even before this since my own graduation from the Illinois College of Optometry when it appeared that a lack of Optometry's inclusion in Medicare would be the death for the profession. The influx of new students into the profession will never be answered by surveys and, in fact, is unrelated to the future for optometry. The future of optometry will always be found in its passionate delivery of vision care to its patients.

I lived through the early questions about going to a medical model of Optometry trying to utilize pharmaceutical agents for our patients. There were as many critics in the past as there were proponents of expanding the scope of practice for Optometry. Now it is almost a given that Optometry's scope of practice in almost all states serves its patients better and protects the vision of its patients at an unparalleled level of excellence. We can fall back into the old fears and doubts about the number of students affecting the practice of optometry. We can answer yet again all of the wrong questions about Optometry. We can expend unnecessary emotional energy on how many students submit applications to our schools or we can direct our focus to what has made Optometry great focus on expanded the vision care treatment protocols which benefit our patients. The Colleges need to graduate each student eager to join the professional association and be responsible for demanding all of the Primary Care diagnostic and treatment protocols their patients are entitled to receive. The answer lies in the expansion of the practice of primary care Optometry. KYCO is one of the answers to the future of the practice of optometry.

The fact that we will graduate 60 new students who have the well prepared ability to perform primary care surgical procedures is the launching point for the future. One of our great sister schools, Northeastern State University College of Optometry has been exceptional in their ability to provide this service across the country until now.

Now, Optometry has two resources to begin to improve the access and level of visual care for our patients. It was made clear as we began the school that it would be very difficult to put a school in Central Appalachia. I was told many times that even if we had a school, we could never attract faculty to this region. We had 17 applications the first day our ads began to appear. There were many who doubted any student would want to come to this beautiful area of our country to study.

If Optometry focuses on its patients, and the schools provide students to our state associations, we will win the rights of primary care for all of Optometry, including its right to perform primary care surgical procedures. In this scenario it is unlikely we'll ever have enough optometrists to fill the need of the population. No, I don't believe that the optometry sky is falling; I am a strong believer that the best days of the profession of Optometry are still ahead of it.

KYCO just labored through the new standards for Optometry set forth by the Accreditation Council for Optometric Education. The standards were among the most rigorous that I have ever encountered. The depth, scope, and financial demands of starting a new school were developed with a thoroughness that I had not seen even in the military hospital inspections that I have prepared for. The new standards developed for Optometry schools are ones which we can be very proud. Optometric education is held to a quality and thoroughness by the Accreditation Council that can only result in the exceptional quality graduate that our future practice of Optometry demands.

So, that's our look at KYCO, which seems poised to help bring the best and brightest into the field. If you have any questions about the university, or anything you'd like to know about upcoming universities, please let us know by sending us an email to: **editor@optmagazine.com**

— Special Thanks to Andrew R. Buzzelli, O.D., M.S.
Kentucky College of Optometry, Founding Dean

UPike-Collaborative Classroom
Architectural render from Ayers Saint Gross & Trivers Associates

VALUE EYEWEAR:
A SMART and PROFITABLE NICHE
— and JUST A GREAT IDEA for a SECOND PAIR

DELICIOUS NOMS*
*Not a recommended source of nutrition for infants... but we know it happens.

— Paula J. Weissman - Modern Optical
Vice President of Marketing

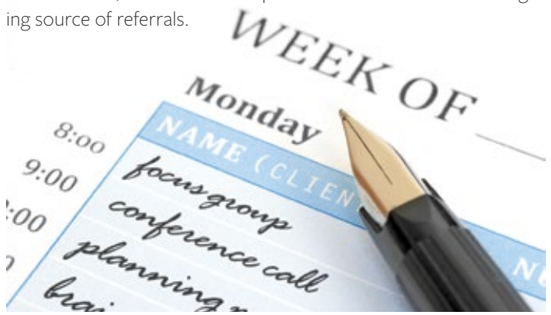
Value eyewear plays an essential role in any ECP's business plan, even in an upscale dispensary. As consumers increasingly turn to the Internet in search of transparency and value, ECPs must offer their patients an assortment of quality eyewear at affordable prices. Now more than ever, the savvy office manager will provide a broad selection of lower- priced frames not only to maximize their customer reach, but also to compete with chains, mass merchandisers and online retailers. With insightful, strategic management of a practice's value frame boards, this niche can quickly turn into a high-volume profit center.

The value eyewear consumer has many profiles. Generally speaking, the typical value eyewear patient utilizes some sort of managed care plan, whether it's Medicare or an employer's vision plan. These plans cover a huge segment of the population which, depending on your location, can represent a very significant portion of your patient base. However, even if your dispensary is in a more affluent area, value eyewear has its place as these patients often times opt for multiple pairs of lower-priced frames to keep at the office, in the car, at home, etc. In addition, transcending all socio-economic lines is today's "Bargain Shopper" culture that emerged from the ashes of the recession. Consumers love to get the designer look without paying designer prices. Eyewear is no exception. Getting something for less is, quite simply, the new consumer way of shopping.

Consider the following guidelines to help maximize your return on investment...

1 Review Your Plans

Adding new plans can quickly increase your customer base. Develop contacts with HR directors of local companies so you can adapt to changes in their vision coverage. By creating strong communication channels, these relationships can become an excellent ongoing source of referrals.



2 Offer Frame & Lens Programs

Bundling value eyewear with lens options will retain customers, generate volume, and increase margins. These promotions also serve as an effective inventory reduction strategy. Creativity, coupled with smart use of your value frames, will also help you compete with online retailers and big box stores. For example, retain your contact lens patients by designating a display board called "Pajama Frames" whereby patients purchase one-year worth of contacts, and get their bedtime glasses for only $75. Another way to compete with online retailers is to create a special $99 Frame & Lens Board. Remind your patients that unlike many online eyewear purchases, a complete frame/lens package bought in their offices is always under warranty. Consider offering such packages as cash specials and watch your margins grow. At a time when online and big chain retailers are squeezing ECPs, these pricing specials will enable you not only to compete, but thrive.

3 Promote Multiple Pairs

Value eyewear is perfect for second-pair sales. Patients affordably acquire that extra pair of glasses they might not normally buy while the ECP secures an additional sale. Help the patient identify lifestyle needs that would warrant an additional pair. What are their hobbies? Keep a pair in the workshop or golf bag. Do they telecommute part-time? Have one pair for the office and one at home. Do they have problems driving at night or under bright conditions? Driving glasses can be stored in the glove compartment. Is excessive computer use causing eyestrain? Talk about the benefits of computer glasses. Finally, remember that eyewear is an accessory! Help your patients boost their fashion sense by finding that "fun" pair simply for the sake of sprucing up the wardrobe.

4 Source a Quality Vendor

Value eyewear does not have to mean junk, and selling poorly made frames will only erode your customer base over time. Buy quality frames from a reputable vendor that backs its products with strong, reliable warranties and friendly, responsive customer service. Evaluate a vendor's product offerings: Are their styles on-trend with today's fashions? Is the selection broad enough to cover your needs? What is their back order rate? How do they handle returns? Do they have an up-to-date, user-friendly website? Each point is important when deciding which frame supplier(s) to use.

5 Carry a Diverse Assortment

Value eyewear is more fashionable than ever! These frames have many of the design elements of today's branded collections, but are now accessible to the price-conscious consumer at a bargain price. Just like the rest of your frame inventory, carry a variety of classic, retro, and modern styles in an assortment of colors and materials including acetate, metal, titanium, or TR90. Offering stylish, yet affordable, options will allow patients to leave your office feeling great in the pocketbook and in the mirror.

Dedicating a portion of your frame inventory to value eyewear makes smart business sense. A careful review of these five guidelines will allow ECPs to better serve patients' needs and effectively compete against big box stores, chains and online retailers. It's a true win-win scenario!

FREE EQUIPMENT event

camber REWARDS
featuring COBURN TECHNOLOGIES

ONLY 18 pairs/month*

Kowa KFC-WX3D
Non-Mydriatic Retinal Camera

What is camberREWARDS?

Camber™ Rewards has been designed to make it easy for you to use **Eagle™ Camber™ Lenses** as your progressive lens of choice. Through a partnership with Norwood Device & Diagnostics and Younger Optics, we have created a program where everyone comes out a winner.

How does it work?

This program is as easy as we could make it, so there's just three easy steps:

1 PICK EQUIPMENT
You can search by either equipment type or by vendor. We have plenty of exam and edging equipment to choose from, with more being added regularly.

2 USE EAGLE™ LENSES with CAMBER™ TECHNOLOGY
These are cutting edge free-form technology, and come with Independence® anti-reflective coating.

3 GET REWARDS
Distributed on a monthly basis, getting rewarded to use the best lenses on the market is a win for everyone.

What's in it for me?

FREE STUFF! Exam equipment, edgers, and more!

ONLY 5 pairs/month*

Drilling Unit
HDM-8000

ONLY 17 pairs/month

Exxpert Edger
HPE-8000

ONLY 19 pairs/month

Edger with Drill
HPE-810

ONLY 9 pairs/month

Automatic Lens
Blocker/Tracer
HAB-8000

ADDITIONAL COBURN PRODUCTS AVAILABLE

Coburn Full Exam Lane†	18 pairs/month
Huvitz AutoRefractor Keratometer with Auto Mode - H-ARK-8000	7 pairs/month
KOWA Non-Mydriatic Fundus Camera 7 - KFC-724MP	12 pairs/month
Coburn Excelon Edger - CPE-4000	9 pairs/month
Coburn Smart Semi-Manual Blocker - HBK-7000	4 pair/month
Coburn Excelon Tracer - CFR-4000	3 pairs/month
Coburn Excelon Edger System B - CEEP-8000	18 pairs/month
Coburn Patternless Edger System - CHPE-810	28 pairs/month
Coburn Excelon Edger System A - CEEP-4000	15 pairs/month
Coburn Complete Exxpert System - CEXP-8000	31 pairs/month

†Coburn Full Exam Lane Includes:

2000-CH	(Norwood Exam Chair)
2000-ST	(Norwood Instrument Stand)
HDP-7000	(Huvitz Digital Phoropter)
HAC-7000	(Huvitz Auto Chart Projector)
HSL-5500 LED	(Huvitz LED Compact Slit Lamp)

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For full details and more product choices visit **www.camberRewards.com**

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Paula Weissman ..... *Value Eyewear*

OPT Magazine

Published whenever we get around to it.

Content/Accuracy

Everything in the magazine should be accurate, but there's always the possibility we got something wrong. If you find something that's not right, please let us know. That being said - I'm a magazine, not a doctor. Nothing here should be construed as medical advice, or assumed to be completely, 100%, definitely correct.

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Unlike most magazines, we definitely endorse everything we run. All of the products you find in this magazine are awesome, and you should definitely buy and/or use them. If we don't agree with something, we don't print it.

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Paula Weissman is VP of Marketing for Modern Optical International. She received her MBA from University of Chicago and her BS from University of Illinois. An active community member, Paula serves on the board for an auxiliary of Lurie Children's Hospital in Chicago and on the JUF Women's Board.

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Dr. Arian Fartash is a second generation optometrist who lives and practices in California. She practices Optometry in a corporate setting, private practice, and in nursing home facilities, which gives her a wide range of experience in the field. When Dr. Fartash is not busy examining eyes, she enjoys time with her husband traveling and taking pictures along the way for her Instagram, @glamoptometrist.

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Dr. Jason Smith is a 2nd generation optometrist and has been in public practice for 23 years. He is a graduate of the New England College of Optometry and was the first optometrist to receive a Master's degree in Health Care Administration from King's College in Wilkes-Barre, PA where he is a member of the faculty advisory committee for health care.

Dr. Beth Carlock

Dr. Beth Carlock graduated from The Ohio State University with the Doctor of Optometry degree in 1995. She has special interests in retinal disease, genetic eye disorders, contact lenses and visual rehabilitation. Dr. Carlock enjoys writing and has had articles published in several journals.

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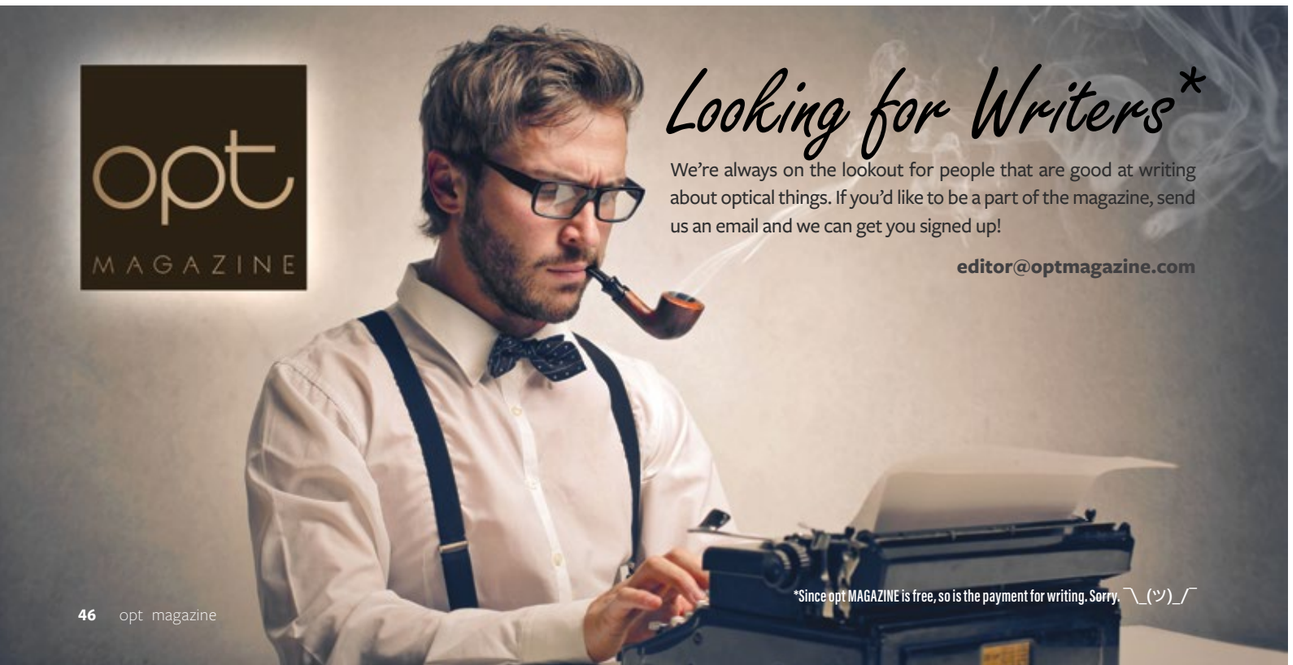
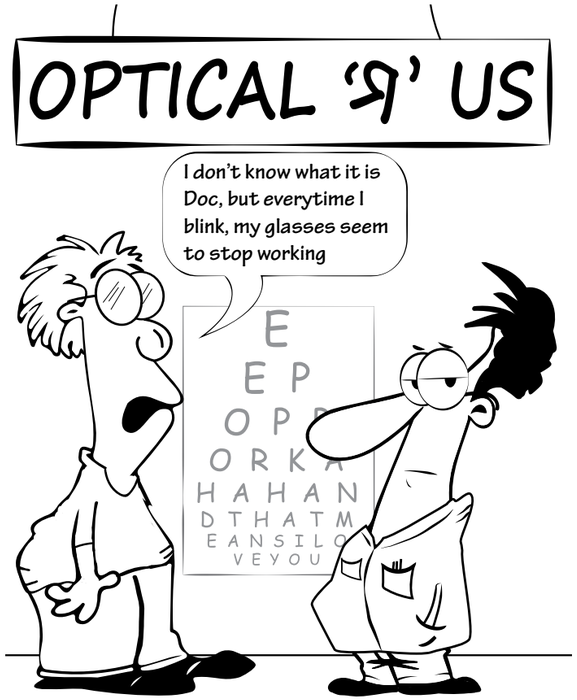
Practice Management Consultant and founder of O.D.Practice Mentors. Tom knew at the ripe age of 9 that he would enter the field of optometry, and as time went by, it was the business side of optometry that interested him much more than ocular pathologies. Tom has worked in every staff position in different practice settings for 13 years. www.odpracticementors.com



OPT - The Spectacles



OPT - Cryptogram

A	B	C	D	E	F	G	H	I	J	K	L	M
6												

N	O	P	Q	R	S	T	U	V	W	X	Y	Z

10 24 19 24 13 1 24 26 24 2

10 24 2 A 23 6 22 23 25 22 25 24

A 8 6 1 16 19 7 10

Hint: Blackmore
Last Issue Cryptogram: Be sure to drink your Ovaltine

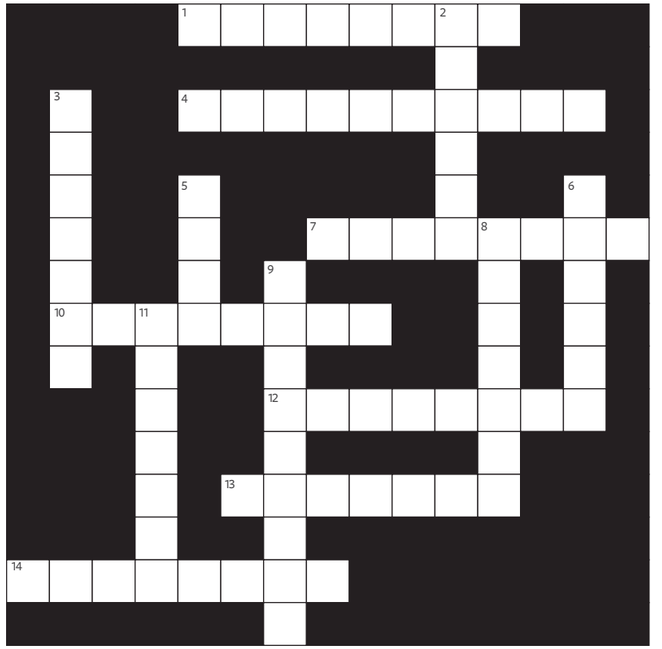
OPT - Fun Facts

- *Some women can have a genetic mutation which causes them to see millions of colors.*
- *People with blue eyes have a higher alcohol tolerance.*
- *Eigengrau ("brain gray") is the color your eyes see in total darkness.*

Source: http://www.factslides.com/s-Eyes

OPT - Crossword

Theme- "It's in the mag"

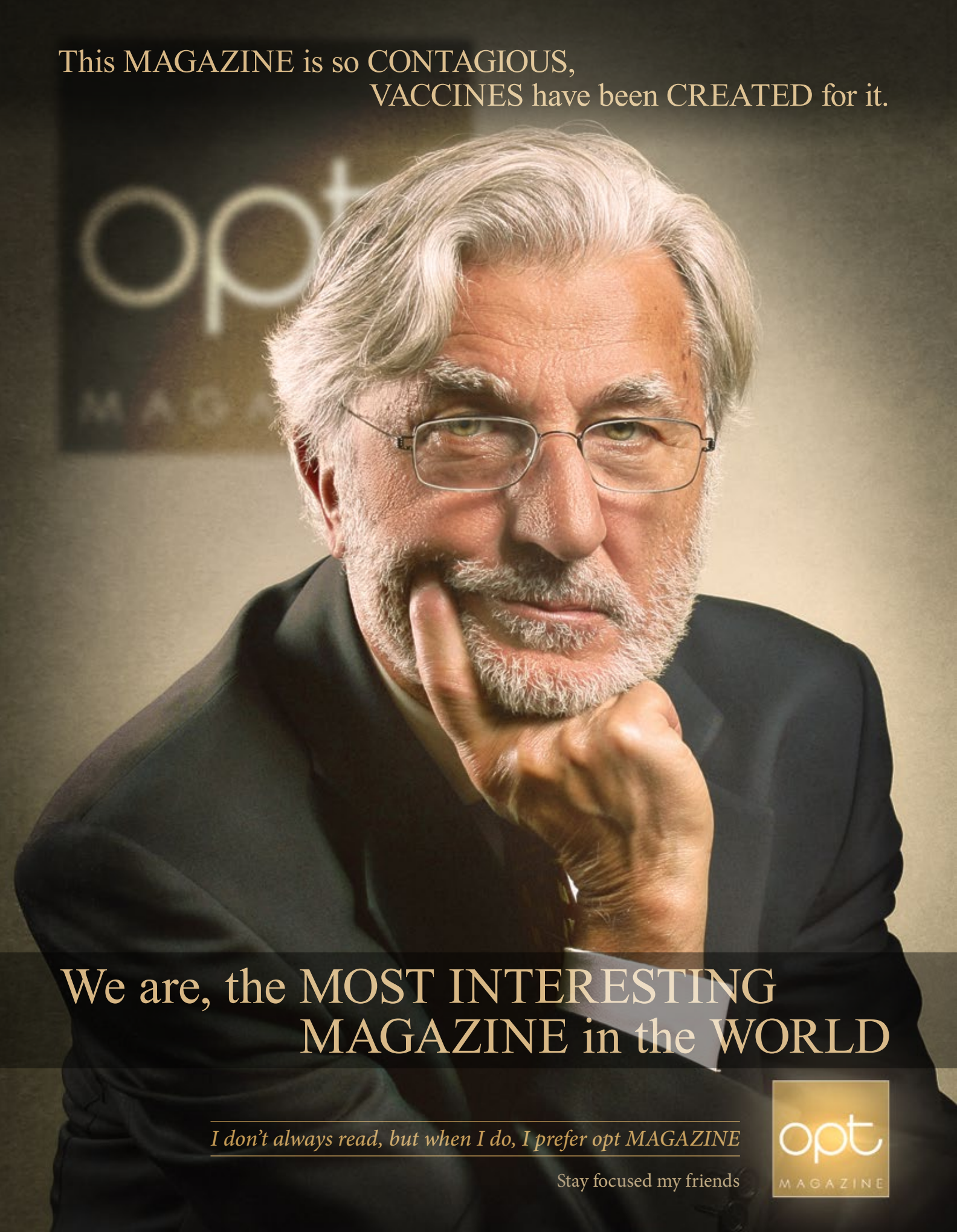


ACROSS

1 State in which the newest school of optometry is located (8)
4 Eyewear company supporting animal charities (10)
7 New Photochromic lens that changes back rapidly (8)
10 Colors made up of primary and secondary colors (8)
12 The types of colors used by electronic devices (8)
13 What the cool kids call this: # (7)
14 School featured in the mandatory frame advertisement (8)

DOWN

2 Temperature scale used to measure lamp colors (6)
3 Creating this in patients will make sure they keep coming back (7)
5 Kingpin of the Chroma Family (4)
6 The color of OPTimism (6)
8 Large glass manufacturing company (7)
9 Acquired color vision disorder that causes the lens of the eye to turn brown (9)
11 _____ in the dark (7)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