It's All About the Wearer, Now

How Lens Personalization Changes Everything

Five Factors Influencing the Personalization Trend in Lenses:

- Patient's Rx
- Frame and lens choice
- Position of wear
- Viewing activities
- Visual behavior

BY ANDREW KARP / GROUP EDITOR, LENSES + TECHNOLOGY

Purchasing a new pair of eyeglasses has always been a personal experience. Each step in the process—having an eye exam, selecting a frame and lens, receiving the finished glasses and having them properly adjusted—reinforces to the patient that they are buying a product made especially for them.

In the past few years, customization in eyeglasses has taken on exciting new dimensions. This has been most evident in eyeglass lenses. The advent of free-form manufacturing technology has enabled lens designers to create lenses that offer sharper vision with greater degrees of personalization based upon the patient's prescription, frame and lens choice, position of wear, viewing activities and visual behavior.

These enhancements give patients an unprecedented amount of flexibility in choosing a lens that is tailored to their individual requirements. In short, today's lenses are adapting more to the patient, rather than the patient having to adapt to the lens.

In this exclusive *VM* feature, a diverse group of lens manufacturing executives give their take on the current personalization trend in lenses and explain why it's all about the wearer, now. ■

"Lens designs have improved with time, but the underlying paradigm is still the same—merging one or more fixed powers into a single lens. Given the nature of light and lens architecture, multifocal lenses have inherent drawbacks."

DAVID CHUTE
Global Managing Director, Adaptive Lens Technology
Adlens

The optical industry has been built on fixed power lenses. When we are young, the crystalline lens in our eye does the focusing for us, and fixed power lenses are adequate for most purposes. As we age and our ability to accommodate declines, fixed power lenses (single vision) are no longer adequate. All the innovations around bifocal, multifocal and progressive lenses have been trying to figure out how to build two or more powers into a single lens. Lens designs have improved with time, but the underlying paradigm is still the same—merging one or more fixed powers into a single lens. Given the nature of light and lens architecture, multifocal lenses have inherent drawbacks.

Adlens uses fluid-filled lens technology to enable the entire lens to change shape over a prescribed range. This enables the user to focus a single lens so that the entire field of view can be focused on a near or intermediate or distant object.

Adlens will be launching the Hemisphere collection at Vision Expo West, a first-generation product incorporating fluid-filled lens technology. Hemisphere instant prescription eyewear allows dispensers to 'dial, set and seal' the wearer's prescription by adjusting fluid-filled lenses in each eye. The refractive power of each polycarbonate lens is set by adjusting external reservoirs of optically-clear silicon fluid. Once the prescription in each eye is set, the dispenser can remove the reservoirs and seal off the fill port with color-matched tabs.

Hemisphere adjustable prescription sunglasses and computer glasses provide instant vision correction and immediate dispensing. Instant prescription eyewear can be customized for different activities: prescription suns for outdoor use, clear lenses for intermediate computer vision. This is the first application of its kind in the optical industry.

The Adlens R&D team in Oxford is working on more sophisticated applications of fluid-filled lens technology to enable the wearer to control the focus of their eyewear after it has been dispensed.

"We can think about lens personalization as having multiple dimensions. One relates to the physiology of the eye itself... another involves the interaction of the patient with the eyewear."

CLAUDE LABEEUW
Vice President, Marketing
Carl Zeiss Vision

The lens personalization trend continues to evolve as we find more ways to capture data about the patient and translate it into a better, more personalized lens.

We can think about lens personalization as having multiple dimensions. One relates to the physiology of the eye itself. By designing the lens for one specific prescription, we overcome the compromises inherent in traditional base curves. Our improved CORE (Center of Rotation Evaluation) technology, available in the new Zeiss Progressive Individual 2, customizes the lens based on a very accurate calculation of the patient's center of rotation, without the need for measurements. And with i.Scription by Zeiss, we stretch the bounds of what a lens can do by accounting for a patient's higher-order wavefront aberrations for better night vision, contrast and color perception.

Another dimension involves the interaction of the patient with the eyewear. Carl Zeiss Vision pioneered the idea of customizing lenses for the wearing position, by compensating for back vertex, panto and frame wrap. This customization delivers the prescribed powers more accurately to the patient for better visual acuity. Some of our progressives also include a variable corridor that automatically sizes the lens optics for the patient's frame.

Zeiss Progressive Individual 2 with Eyefit technology takes personalization into a new dimension: the patient's visual activity profile. The "ideal balance" of viewing zones varies based on the individual's visual activities, so we have given eyecare professionals the flexibility to alter the zone balance accordingly. The baseline Individual 2 option has no "bias" toward a particular zone. Option 2N provides up to 30 percent more near vision, while Option 2I provides up to 25 percent more intermediate and improved dynamic vision. This allows the eyecare professional to retain full control over the design, while keeping the personalization simple, straightforward and patient-needs-based.

More advanced personalization also requires improved tools for the practice, which we address with our i.Profiler wavefront aberrometer/autorefractor/ corneal topographer, and our new i.Terminal2 by Zeiss advanced centration and demonstration device.

"Every lens design rolling out to market in the future is touting customization. However, the best products will be differentiated by how meaningful that customization is to the wearer."

CARL BRACY
Senior Vice President, Marketing and New Business
Essilor of America

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meaningful that customization is to the wearer. Ultimately, lens innovation and customization must ensure the wearer sees better longer and address the unmet needs of the patient. When Essilor develops new products, we take into account three specific segments of customization: optimization of the prescription, usage/activity, and wearer protection.

Essilor products are customized through additional measurements that optimize the patient prescription. For example, eyecode lenses are based on real, dynamic 3D measurements of the eye, the frame, and visual behavior of the wearer. They use the wearer's real eye rotation center and natural head posture data to perfectly calculate the design for each eye, of every wearer.

We have taken that a step further with the Varilux S Series lenses. The most sophisticated level of advancement in the Varilux S Series is the Varilux S 4D lens. Just as people are right handed or left handed, they also have a leading dominant eye—the eye that reaches the object being viewed first when we change gaze direction. Only 4D Technology factors in the leading dominant eye and other personalized measurements to deliver faster visual reaction time.

Essilor takes activity/usage of the lens into account as well. Through products like computer lenses and developing wrap lenses for sports, we create an optical optimization that benefits both the wearer's vision and the cosmetics of the lens through adjustment to the frame, including thickness.

When discussing protection as a part of customization, most people think of the physical protection of the lens, like anti-scratch, anti-smudge, etc. With Crizal UV products that provide all the lens protection benefits plus take into account the protection of the wearer's vision over time, Essilor realized an unmet patient need. This customization has moved the need for UV protection around the eyes and Crizal into the health discussion with the patient. For Essilor, Crizal UV is just now grazing the surface of health benefits that lenses can provide.

Through customization of lenses now and in the future, Essilor is and will continue to change the way people look at wearing glasses.

"The ability to serve patients in the new media landscape offers a great opportunity for independent practices to differentiate themselves from competitors."

BARNEY DOUGHER
President
Hoya Vision Care, North America

At one time, the holy grail of optics was to find a way to provide presbyopes with one pair of glasses that would serve all of their needs. With digital surfacing equipment, free-form designs and precise measuring tools we have come very close to doing just that.

However, along with advances in lens technology came changes in the way we consume media. Cell phones, iPods, laptops and e-readers have made our consumption of media vastly different than it was just 10 years ago. The effects of back lit screens on blink rate and other physiological factors call for more customization in vision correction in order to add comfort to our overall visual experience and avoid Computer Vision Syndrome. In short, new media requires new vision correction solutions. That's why we developed our New Media Optics line of lenses, which includes Tact and Sync. These lenses are designed for patients who are heavy users of digital media.

The ability to serve patients in the new media landscape offers a great opportunity for independent practices to differentiate themselves from competitors. It is part of the trend toward personalized lenses that the Hoya Free-Form company is leading. For example, Hoya's MyStyle lenses, first introduced in 2008, are personalized. They take into account 35 different factors including direct input from the patient. Patients can tell their independent ECP about their activities, hobbies, habits and even the things they liked and disliked about their previous prescription in order for our free-form software to design unique lenses for them. We start with a blank slate and then practically embed the patient's DNA.

It's important to note, though, that personalization is more than just capturing frame measurements. To create a truly personalized lens design that delivers a unique vision correction and a 'wow' experience, you have to incorporate the patient's lifestyle, and that's Hoya's approach.

"We see clearly... a shift of concept: instead of the patient making efforts to adapt to a lens type, the lens is adapting to each individual's visual strategy."

ALEXANDRE BOUIN
International Manager
Lens & Free-Form Solutions
Indo

Most of the ophthalmic lenses and frames offered today under the tag "personalized" are in fact mass customization. They adapt to particular needs but are not comprehensively taking into consideration all unique parameters of the patient. Personalization goes far beyond mass customization in order to provide a product made only for individual buyers and is uniquely usable by them.

In the early 2000s, Indo developed a breakthrough technology in lens personalization. Named "Visual Strategy Mapping," it simulates in a 3D environment the combined movements of head and eyes in order to establish a behavioral pattern. The device used to capture this information is called the "Visual Map Developer." Data obtained is translated into a lens design as unique as a fingerprint. Each individual has a different visual map

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that must be considered in order to maximize the probabilities of adaptation. We see clearly that it is a shift of concept: instead of the patient making efforts to adapt to a lens type, the lens is adapting to each individual's visual strategy. This development has coincided with the birth of free-form cutting technology, which has enabled lens manufacturers to realize those unique designs that are impossible to make with conventional surfacing.

Recently, Indo pushed the limits again with the development of FreeMax technology. FreeMax includes frame shape into the calculation of the lens design in order to obtain a dynamic relocation of the aberration outside the useful shape that will be cut during edging. Another "collateral" advantage of FreeMax technology outside of the personalization is that it offers a much higher grade of thickness optimization that is impossible to reach with free-form technology. We have concentrated this cocktail of innovation into two lenses that have been finalists at the innovation contest of "Silmo d'or" in 2011: Eyemax and Maxima.

We have also launched an ambitious program called Made4U. This program is aiming at transposing the concept of integral lens personalization to the entire spectacle and being able to manufacture personalized frames as well. It compounds all the technologies explained here and includes face morphology indicators that allow the creation of a 3D frame, providing optimum comfort to the user.

"In the near future, we believe that aberration reduction and lens performance can be further improved with combinations of special lens blanks, materials and digital lens design and IOT is moving in that direction."

DANIEL CRESPO
President
Indizen Optical Technologies (IOT)

At IOT, we believe that two main factors need to be considered in lens customization: aberration reduction and lifestyle customization.

When computing a digital lens' surface, we can calculate the aberrations that the eye would perceive in every direction of sight, then compensate the lens power at each point in order to reduce those aberrations. This results in much larger areas of the lens that the wearer can comfortably use with sharp vision. This type of customization requires information about the lens position and orientation, like pupillary distances, panto, wrap, etc. Aberration reduction is important not only for progressives, but also in single-vision wraps and high prescriptions. Most of IOT's lenses today include this level of customization.

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materials and digital lens design and IOT is moving in that direction.

Another complementary path toward customization is based on wearer lifestyle. For progressive lenses, we need to decide how to distribute the distance, intermediate and near zones on the lens in order to meet the specific wearer's demands. Each wearer's lifestyle presents unique visual needs that can benefit from a personalized progressive design.

This is a field that still requires a lot of research if we want to go beyond the most trivial factors such as 'playing sports requires less near vision.' At IOT we have embarked on a long term research effort to assess empirically the relationship between progressive design features and a wearer's proclaimed lifestyle, which is very subjective. This will take us closer and closer to the goal of selecting the best lens for every wearer, which is the ultimate goal of customization.

"We see significant expansion in the private label category, which we feel will gain market share from conventional, front surface PALs at a faster pace than anyone could anticipate because of their value proposition."

MIKE RYBACKI

Senior Vice President, Sales and Marketing
Seiko Optical Products of America

There are varying degrees of lens personalization available today. Some are more about marketing than delivering actual real benefits to the patient. As a result, the U.S. market in general, meaning traditional ECPs, are not quite ready for using free-form lenses with designs that require sophisticated measuring devices until they become more familiar with dispensing standard free-form (FF) products.

There have been several attempts to introduce fitting devices to achieve the so-called highest levels of customization, and these have had limited success. I have seen these devices rolled out at many ECP offices and even some national chains. For the most part they go unused or have been pulled back.

There is also a smoke and mirror situation taking effect here on the supply side with the real intent to keep FF price points artificially high while at the same time trying to lock-up the ECP's business with the commitment to use these devices. Because not everyone has access to these devices, I see a much bigger trend toward private label FF designs this coming year.

At Seiko, we see continued growth in several areas of free-form lenses. We are confident brands for PALs will continue to be important to support premium products, especially for the more sophisticated, advanced and newest design technologies. However, we also see significant expansion in the private label category, which we feel will gain market share from conventional front surface PALs at a faster pace than anyone could anticipate because of their value proposition. This trend is being fueled by both independent labs producing their own brands in-house and also larger manufacturers utilizing offshore labs via both wholesale and direct distribution channels. Seiko will provide product solutions in all these areas.

However, there is still plenty of room for dispensing more specialized types of designs that are not so much customized, but designs that are task- and user-specific. Recent examples of these products include Seiko Surmount/Ws, PCWide, WrapTech Thin and Super MV. This is where Seiko believes the real benefits of FF technology are, and this is apparent to the ECP who can more easily understand when and how to use these lenses.

"We are now moving past [general purpose lenses] and focusing on 'task-specific' lenses, as we see the market moving more toward individual personalization at the task level."

RAANAN NAFTALOVICH

President
Shamir Insight

The trend toward customization in all products is widespread. Shamir realized this trend and developed Autograph II, launched in 2008, which incorporated two significant personalization technologies into it. The first was As-Worn Technology, which provided patient customization down to the level of the position of wear for each patient. The second was Freeframe Technology which incorporates features into our lens calculation software that allow each patient's lens to be optimized for whatever frame the patient chooses. However, Autograph II is a general purpose lens. We are now moving past that and focusing on "task-specific" lenses, as we see the market moving more toward individual personalization at the task level.

A case in point is our newest lens which we are launching at Vision Expo West: Shamir InTouch. Today's modern lifestyles are changing as fast as new technologies hit the market. Use of digital devices and screens has become an increasingly frequent part of everyday life. This presents our patient's eyes with special challenges as they switch back and forth between distant and mid-range viewing and reading small print on smartphones, tablets or other handheld digital devices. The reason we created this lens was to provide our patients with the clarity they need to stay connected and see clearly while doing the task-specific activities of using their smartphones, tablets and e-readers.

By looking at the millions of people holding their smartphones and tablets (along with extensive clinical studies), we found that handheld devices are held higher and closer (between 15" to 27") than a book would be. So we designed InTouch based off those findings.

Another task-specific lens that we recently launched is Shamir Golf which resolves the problem of golfers not being able to see through the intermediate zone clearly enough to see the ball at their feet.

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In the future, we see this trend of personalization in the task-specific categories growing. Shamir will continue to be on the cutting edge of designing lenses to meet this trend.

"Nikon's Seecoat Blue is the first in a new category of functional anti-reflective coatings that reduce blue light, improve contrast and reduce eye fatigue."

RICK DAVIS
Executive Vice President
Nikon Optical USA

Americans, on average, spend over half their waking hours in front of digital screens, such as computers, smart phones, tablets and televisions. These devices emit strong blue light which scatters easily, reducing contrast and adding to eye fatigue. Nikon's Seecoat Blue is the first in a new category of functional anti-reflective coatings that reduce blue light, improve contrast and reduce eye fatigue.

Japan is a highly evolved ophthalmic lens market where 99 percent of all lenses are AR coated. Since it was introduced in Japan over a year ago, Nikon Seecoat Blue has received the prestigious Japanese "Good Design Award." Nikon Optical USA is proud to bring the benefits of this technology and important category to the U.S. market.

"In the future, we will see even more designs for different lifestyles, frame shapes and facial customization. For the definition and calculation of this kind of lens, additional patient measurement information and data is required."

RUDOLF SUTER
Chairman
PFO Global

All lens designs, single vision or multifocal, which are produced by digital surfacing, are software driven. The limit on the number of different lens designs is the sky. That's why in the future we will see even more designs for different lifestyles, frame shapes and facial customization. For the definition and calculation of this kind of lens, additional patient measurement information and data is required. That's why, over the last two years, PFO Global has been working on tablet and desktop patient facial measurement units.

Our SmartEyePix measures monocular and binocular distance and near PD, vertex distance, wrap angle, and pantascopic tilt. It does frame try-on, contact lens consulting, lens and lens treatment consulting. It is the most complete system available in the market. It is also the only system worldwide which measures these parameters without an awkward template. This is done with PFO's patented facial recognition system. The system is connected to the EyeCloud in order to transmit all this technical information along with the user or lifestyle data of the customer. All this information is used to calculate the tailor-made lens. The PFO "identity" lenses fulfill these requirements. These types of lenses should become the standard. We are also working with several sunglass companies to provide the lenses for their launch of Rx sunglass and wrap Rx sunglass lines. New lens materials combined with this calculation technology are the trendsetters in the sunglass industry.

All the AR coatings available on the market are at the top of the transmission with ratings of over 99.5 percent. However, there is a differentiation in the available topcoats in terms of lifespan and cleanness performance. PFO just offers only one quality, the top of the topcoats on its lenses.

"All of our products reflect the inherent understanding that there is not a one-size-fits-all solution for consumers, but rather different products—often multiple products—that can meet their needs at different points in time."

BRIAN HAUSER
General Manager, North America
Transitions Optical

Finding out what is right for each and every patient is at the heart of Transitions Optical's product development. It drives the direction of our research and development and motivates us to continually push the limits of photochromic technology to increase category growth.

We have always focused on providing the best possible photochromic technology to consumers. Increasingly, that's meant more directed efforts targeted to meeting the specific needs of different groups of consumers. When photochromic technology was relatively new, our primary goal was to advance the technology to provide the optimal balance of all photochromic properties for all wearers. That's the foundation of our business, and still our starting point for all our products. However, we recognize that different wearers have different priorities. For example, some wearers who spend a lot of time outdoors prioritize superior darkness over indoor clarity. Many are looking for specific sunwear products that can help them perform better in outdoor sports and activities. Others want an everyday lens that can help to minimize glare to ensure the sharpest, crispest vision.

In order to meet all consumer needs we've evolved our product development to push the technology in new directions. Understanding what the wearer wants—and the way they actually experience vision wearing our products—helps us continually break new ground in product develop-

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ment. Perfect examples of this include our darkest everyday lens—Transitions XTRActive lenses; our newest breakthrough product—Transitions Vantage lenses, which darken and polarize outdoors; and our line of Transitions performance sunwear products—all designed for outdoor use during a specific sport or activity.

All of our products reflect the inherent understanding that there is not a one-size-fits-all solution for consumers, but rather different products—often multiple products—that can meet their needs at different points in time.

Our family of brands enables us to meet more consumer needs and help eyecare professionals increase patient satisfaction with photochromic lenses for all patients while continuing to grow the category.

"As advanced refractive and frame fit technology is developed, lenses will become even more customizable on both surfaces."

DAVE DELLE DONNE

Vice President, Business Development
VSP Optics Group

Like it or not, we live in the age of customization. Today's consumers expect to be able to pick and choose options for the products they buy. From customizing their music playlists, to designing their latest pair of Nike shoes, to picking the options they want in their cars, consumers want products made just for them and the lifestyles they lead. And their eyewear is no exception.

With the growing popularity of digital backside surfacing, we're now prepared to take lens customization to the next level. By incorporating the position of wear, frame wrap, pantoscopic tilt, and back-vertex distance, we can make lenses tailored exactly to any patient's needs. But this is only the beginning of our industry's path down the "customized" revolution; as advanced refractive and frame fit technology is developed, lenses will become even more customizable on both surfaces.

Prior to the free-form revolution, VSP Optics Group always held the mindset that we are creating one-of-a-kind eyewear for each and every patient. It's easy to look inside any one of our labs and think of it as "mass producing" eyewear, but that's not correct. We're "mass customizing" eyewear. While we produce thousands of glasses every day, no two pair are alike. From unique prescriptions, to different selections in lens designs, materials and coatings, we're customizing lenses to fit the individualized needs of patients.

This fall, VSP Optics Group will introduce:

Unity UVR, a backside lens coating that protects the wearer's eyes and the skin surrounding the eyes from reflected ultraviolet ray exposure; and otto (one touch to optical), an iPad app that serves as a virtual optical assistant that simplifies the customized, digital lens dispensing process and enhances the patient experience.

"Custom lens solutions that respond to individual customers' needs are a vital pathway to preserving the ECP/patient relationship, and thus the strength of the ECP's business."

DAVID RIPS

President
Younger Optics

Customization is one of the most exciting and important developments in ophthalmic lenses today. In the past, many ECPs tried to find "one-lens-fits-all" solutions in their optical dispensing. The temptation to do this is great because of potential savings and ease in training. Of course, this approach leads to patient dissatisfaction, and the ECP's business suffers.

There are more ways to customize than ever before when you consider materials, designs and lens treatments. While people may debate the strengths and weaknesses of a certain material, the fact of the matter is, a material that is right for one patient may not be well-suited for another. For example, polycarbonate lenses have advantages in terms of impact resistance and availability, yet some patients just cannot wear them because of chromatic aberration issues caused by polycarbonate's low Abbe value. To prescribe polycarbonate lenses to these patients would lead to dissatisfaction, which damages the ECP/patient relationship. One alternative is the Trilogy lens material, made from Trivex, which can solve your patient's problem with aberration, while keeping the desired impact resistance and light weight.

Lens treatments are another way to provide a lens customized to your patient's needs. For example, Younger's Drivewear lens was designed specifically for drivers, and it's still the only polarized photochromic lens that darkens and changes color behind the windshield. It's important to note, however, that Drivewear lenses aren't just for driving. I think it's important not to "oversteer" designs toward one particular activity the patient may engage in. If we supply a lens to satisfy the patient's primary activity, we don't want to make the design worse for all the other activities the patient engages in. Drivewear lenses are versatile in that way. They are a great polarized lens for outdoor activity as well, because they reach their darkest state in direct sunlight.

ECPs should resist falling prey to the lure of a one-lens-fits-all solution, which causes ECPs to give up their most important tools—their judgment and professional creativity. Custom lens solutions that respond to individual customers' needs are a vital pathway to preserving the ECP/patient relationship, and thus the strength of the ECP's business. ■

akarp@jobson.com