

## Active Light in Presentation and Retail

Dynamic lighting creates unforgettable shopping experiences

**Creating Light Creates Emotions. Real shopping experiences that we remember with pleasure for years to come are in sharp contrast to the anonymous, digital world of today. Light provides a harmonious connection between the architecture, the product and the individual. It creates emotions that have a positive effect on the intention to purchase and fixes the retail experience in the memory of the consumer. “Limbic® Lighting” from Zumtobel enables a target group-orientated approach for different personality types using messages and images that are generated by individually tailored light scenarios. As it is vital for the human survival instinct to quickly and unconsciously notice moving objects, our eyes are spontaneously directed to anything that changes. The idea behind Active Light from Zumtobel is based on the findings of the Limbic® Lighting laboratory analysis and field study, subtly and dynamically supporting the selective perception of human beings.**



Dynamic light shapes retail experiences - Creating Light Creates Emotion.  
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### Back to the roots

The evolution of life has always been closely linked to nature and daylight. Daylight as the original and fundamental source of light for humans is a diverse phenomenon that has shaped how people experience the world. Changing intensities, light colours and shading patterns influence human perception, altering images that arise in the brain and thereby helping regulate the thought process. Furthermore, when human beings spent time outside, in their original natural environment, the subsequent release of positive emotions stimulates individuals to engage actively.

From today's perspective, seemingly nostalgic shopping environments, which are perceived by the observer as romantic or antiquated, evoke positive associations with times gone by, before artificial light existed. As a result, these kinds of places are still today greeted with a mixture of fascination and sentimentality. In addition to basic purchase requirements, a visit to an open-air market therefore primarily still has a social function. Even Christmas-themed shopping areas and markets look to create atmospheres that exploit the natural connection between people and their underlying yearnings. Gathering in one place, despite the darkness and cold of winter, is a clear sign that humans are continually seeking original experiences and the associated positive emotions associated with these, while also continuing some form of traditional ritual. Emotions that stimulate a purchase are set free when an individual feels that a situation reacts to his or her embedded expectations and sensory feelings. Both natural light and artificial light can reinforce this tendency.

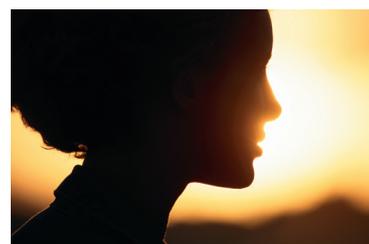
visual



emotional



biological



The three levels of light quality.  
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### **A neuromarketing focus on light and the emotional consumer**

In the broader context of architecture, light is generally regarded as the most important immaterial medium, affecting human perception and the emotional evaluation of the goods on show. In the retail sector, the question is whether a high-quality purchasing environment, in which the atmosphere is decisively shaped by artificial light, is automatically associated with a generally higher price level by consumers. However, this fear has been allayed. On the contrary, retail research has actually shown that an attractive shopping environment increases the value of the products and strengthens purchase intentions.<sup>1</sup> In addition, from our own experience, we know that a higher price for the same item is more likely to be accepted in a small, pleasantly designed store than in a basic shop environment. The field of price psychology explains this phenomenon by citing the notion of transaction value. This is based on the atmospheric evaluation of the act of purchase – where light plays a decisive role – and forms part of the overall retail experience. The stimulating of the senses, the awakening of emotions, the enjoyment of buying something and the long-term memories created make an important contribution to differentiation at a time of hard-fought competition between real and online shopping.

Light supports these psychological parameters through a subtle fusion of architecture and goods presented to reflect the individual approach of the potential buyer. Dynamic lighting scenes are being increasingly chosen to meet the specific expectations of particular target groups. In this way, the purchase environment becomes a stage. The concept of Active Light from Zumtobel fulfils these requirements by not only using the right luminaires to perfectly showcase the goods and the purchasing situation, but also by supporting human perception with constantly regenerated light scenarios that reshape and reinvigorate the retail space. As the visual, emotional and biological needs of the consumers from the various target groups change over the course of the day and year, artificial light has to adapt accordingly. In addition, the point of sale (POS) is subject to the requirements of visual merchandising and changing trends, which is why it often has to be redesigned. A lighting solution based on the principles of Active Light is able to quickly adjust the ambience in the room, helping to ensure that attention is drawn to the target group-specific presentation of certain goods.

### **Use Active Light to plan the right contrasts**

Various studies have shown a connection between the light intensity of a sales area and a higher force of attraction. However, in line with the following points, the way that the basic brightness is increased is a growing issue of debate:

- 1) Sustainability strategies and energy requirements
- 2) Large-scale and brightly lit sales areas create uniform conditions for the perception of a full range of products, meaning that they are more closely associated with typical everyday consumer goods. They are therefore definitely not suitable for all brands and every product positioning.

In order to explore new insights into lighting design in the retail sector, Zumtobel commissioned a special study: "Attention equivalent – a study concerning the effectiveness of specific lighting parameters on the perception and preference of customers in a shop".<sup>2</sup> The study was intended to gauge the extent to which the attractiveness of products and the buying behaviour of customers in shops are influenced by the combination of brightness, light distribution and light colour. The joint research project, led by the Royal Institute of Technology in Stockholm and the University of Applied Sciences in Hamburg, with support from the Felsch Lighting Design studio in Hildesheim, used an online survey and eye tracking in a series of laboratory tests and field trials to define eight key design recommendations for shop lighting:

- 1) Use pinpoint accent lighting to create **contrasts** that stand out from homogeneous general illumination and support the perception selection.
- 2) A **combination** of diffuse general lighting for subjective wellbeing and vertical illuminance to support orientation in the space is recommended. Detailed lighting accents enhance the attractiveness and perception of the goods.
- 3) The targeted use of **coloured light** supports human emotions.
- 4) Lighting solutions with **tunableWhite** technology meet the demands for more flexibility in terms of the colour temperature.
  - a) Cooler colour temperatures make a room appear larger, while warmer tones create a sense of security.
  - b) General lighting with neutral white encourages people to spend longer in a shop and has a positive effect on feelings of wellbeing.
- 5) Lighting solutions planned in line with the Active Light concept use different lighting moods throughout the course of the day to meet the differentiated perceptions and individual expectations according to gender, age and personality type. **Changes** in light intensity, lighting direction and colour during the day enable dynamic adaptation of the installation to suit the particular target group. For example, women generally pay more attention to details and men perceive shops on a larger scale.
- 6) **Window lighting** according to Active Light: The basic brightness of daylight requires a high degree of accent lighting to help notice contrasts. On the other hand, reduced and selective illumination is sufficient to present products during the evening and at night.



#### Intensity

Carefully planned spatial and time-based differences in lighting levels help showcase both the space and the products. A structured hierarchy of perception directs our line of vision.



#### Direction

Specific changes in lighting direction and shadowing add a dramatic edge to the goods on display.



#### Colour

Regulating the light colour in line with the product and the interior architecture improves perception and underlines the impression of quality, which in turn strengthens the willingness to buy.



#### Time

Active Light adapts the lighting to meet the needs of the people. Expectations stemming from the daylight situation and the time of day are reflected in just the same way as the personality structure of the specific Limbic® customer types.

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- 7) **Shelf-integrated** lighting at all levels: Studies involving eye tracking have shown that the lower shelf areas are not adequately perceived. The use of focused accent lighting or a dynamic solution guided by the principles of Active Light in the lower third of shelving areas can provide welcome assistance here.
- 8) A combination of **two-dimensional background illumination and focused accent lighting** increases both the perception and attractiveness of the goods.

The “attention equivalent” study demonstrated not only that the brightest point attracts the attention of passers-by (and therefore influences perception), but also that the highlighting of contrasts in the shop and shop window are especially decisive. This solution also seems to be more practical - especially when it comes to issues such as reduced energy consumption.

The use of lighting to create adjustable dynamics means that solutions defined with the Active Light concept in mind provide crucial added value, helping to make sure that the light situation can be adapted to suit different customer expectations and the specific requirements of a particular shop.

### Light in the shop window: Active Light structures perception

People are equipped with the ability of selective perception to minimise the likelihood of sensory overload. As a result, we focus our attention unconsciously on scenes that really interest us.

Active Light solutions deliberately direct attention by changing the light environment. Dynamic light uses the sizeable visual field of motion detection, which originally helped humans identify potential hazards. Our line of sight is unconsciously drawn to things that move, so that we are able to find a position of safety if we feel threatened. This fundamental instinct can still be used today to steer our attention. A research initiative entitled “A study on the effectiveness of individual dynamic lighting parameters on the perception and preference of passers-by in shop windows”<sup>3</sup> addressed the following questions:

- To what extent do changes in specific lighting parameters increase attention and which effects are more disturbing?
- Is attention focused on the goods or does the effect tend to be distracting?

Using different video clips, various dynamic light scenes were tested to find out which factors influence customer perception and the amount of time spent in a store. The most significant results were:

- 1) Light colour changes are perceived more than variations in brightness.



3D visualisation of a fashion store as part of the Limbic® Lighting study.  
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- 2) Women can recognise the sudden start of highly accentuated lighting more readily than men.
- 3) Half of the participants responded to lighting scenarios that are progressively lighter dimmed. Only 6% noticed a reduction in the luminance level – even though many found this kind of scenario particularly pleasant.
- 4) Men were more likely than women to notice dimmed lighting.

This study ultimately showed how subjectively dynamic lighting scenarios are perceived by customers due to changes in the key aspects of brightness, light distribution and light colour. An intensive analysis of the relevant target group, taking into account the particular emotional personality structure of its members, is therefore highly recommended due to the varied nature of gender-specific assessment.<sup>4</sup>

### **Limbic® Lighting – Putting the focus on customer emotions**

Gaps in research into the notion of light as a success factor in the retail sector led Zumtobel to employ the innovative methods of neuropsychology. The Limbic® Lighting research project was initiated in collaboration with the Gruppe Nymphenburg from Munich.<sup>5</sup> In the laboratory test, various target group-orientated lighting scenarios in shops and retail areas were recreated using virtual reality. A subsequent field test in an actual retail environment revealed that a sales increase of up to 10% is possible when the lighting design is tailored to reflect the expectations of different personality types and the profile of specific target groups.

Numerous neuroscientists have demonstrated in recent decades that emotions are the main driving force behind our behaviour. Only people, situations and products that stimulate human emotions are relevant to the human brain. It is now known that 95 % of our decisions are taken unconsciously, including purchase choices.

The importance of emotions with regard to the psychological analysis of the buying process is also increasingly being incorporated into the methodology of light studies, which means that neuroscientific measurements are becoming more and more useful. Researchers generally agree that verbal metrics based on questionnaires do not always accurately reflect the feeling and behaviour of consumers. As light has such a major influence on perception and mood, experts from the Munich-based Gruppe Nymphenburg, who specialise in neuromarketing, developed a novel new method for the detection of emotions. The Gruppe Nymphenburg consulting organisation is renowned in the research world for the seven emotional Limbic® types model, which defines specific target groups based on characteristics and personality traits. A fashion store with 20 different light scenarios was created for the labora-

tory examination using 3D simulation. This made it possible to analyse the detailed preferences of each target group.

The results for the three groups identified were as follows:

- 1) **BALANCE:** This is where Harmonisers are the largest target group amongst the Limbic® types. Together with Traditionalists and Open-minded people, these individuals prefer gentle light scenes and contrasts with relatively warm light sources (3000 K) and general lighting levels of 800 lx. Accent lighting with average beam angles (20-30 degrees) should be used, while the combination of highly uniform vertical illuminance on the shelves and dimmed accent lighting in the niches and display cases was identified as an important step towards sales success.
- 2) **STIMULANCE:** Light can help unconventional Hedonists and Adventurers find a positive state of relaxation, without leading to boredom. The results show a clear tendency towards stronger contrasts. A blend of different spotlights with distribution angles of between 12 and 16 degrees for dominant accent lighting supports the expectations of these two Limbic® types. Compared to the other groups, basic lighting in the circulation zones and general diffuse light provided by downlights or coving illumination are of little importance to STIMULANCE consumers. This means that these aspects have little more than an architectural or decorative effect. Horizontal general lighting should be planned to achieve levels of around 500 lx. The very high vertical illuminance in combination with rather cold-white light colours has a stimulating effect, even though the 4000 K light colour dominates.
- 3) **DOMINANCE:** This group consists of Performer and Disciplinarian Limbic® types, who tend to be somewhat critical. Balanced and moderate light scenarios have a positive emotional effect. Overstimulation due to extreme, high-contrast and narrow-beam light solutions should definitely be avoided - even if the group is susceptible to subtle mood-enhancing influences. The combination of medium and wide-flood spotlights achieves a high degree of uniformity. This group prefers homogeneous, vertical surfaces, which can also be perceived in peripheral areas. General lighting is best provided by downlights and cove illumination. As can be expected from the findings mentioned above, the DOMINANCE group places the most emphasis on the proportion of diffuse general lighting. The colour temperature with the highest activation potential is between warm and neutral white, with a prevailing tendency towards 4000 K.

Lighting moods designed for target groups encourage customers to stay longer in a shop. As a result, the perception of both the products and the brand is improved, while the chances of a positive purchase decision are also increased. The study has confirmed just how differently target groups react to the slightest changes. Although the adjustments were often barely visible to the naked eye, the psychophysiological data showed strong reactions.

Balance



Stimulance



Dominance



The results of the Limbic® lighting study (Gruppe Nymphenburg): During the Limbic® Lighting research it was possible to identify three lighting scenarios: BALANCE (1.), with moderate accent lighting, STIMULANCE (2.), incorporating contrasts using accent lighting generated by various spots, and then DOMINANCE (3.), characterised by homogeneous light effects. © Zumtobel

### **Gerry Weber casts new light on the matter: Achieving a 10% increase in sales**

The laboratory results of the Limbic® Lighting research were then tested in a field study in a branch of the fashion retailer Gerry Weber. An implicit measurement showed that, when compared to the previous lighting installation, Gerry Weber customers reacted with more emotion to the new Limbic® lighting concept. In the subsequent questionnaire, customers also reported a clear improvement in the atmosphere courtesy of Limbic® Lighting. A visit to the store with the new lighting design resulted overall in a more active reception of the sales situation, higher levels of interest in the goods on show and less stress for customers. The shop with the Limbic® Lighting approach was measured over the same period against a reference store with a comparable demographic profile, customer purchasing power, average conversion rate, size and age criteria. The result was clear: In comparison the Limbic® lighting test store in Herford recorded a sales increase of approximately 10 per cent.<sup>6</sup>

Poor light creates negative moods, while target group-specific light supports the kind of positive emotions that are essential for sales success and a solid price level.

The Active Light concept has integrated the findings obtained from Zumtobel research like the Limbic® Lighting study to, on the one hand, positively appeal to consumers with the light mood that they prefer and, on the other hand, to showcase products and brands in the best possible way. On an emotional level, Active Light creates a light mood that has a positive effect on wellbeing and thereby extends the length of stay in the store. On a visual level, Active Light incorporates subtle adjustments and variation of the luminance level in line with the space and time to direct customer attention and provide orientation. Shadows resulting from the change in the direction of the light allow a skilful and dramatic presentation of the products. Active Light concepts also improve quality assessment by tailoring dynamic light colours to complement particular products. With high-quality architecture, target group-specific light scenes and attractive staging of goods, both the readiness to purchase and the acceptance of a higher price positioning is increased.

### **Future challenges**

In order to be able to truly compete with the world of online shopping in the future, light in conventional retailing needs to appeal to the emotions more than ever before. This in turn requires lighting concepts to be optimised to reflect both key target groups and the particular brand positioning. The blend of coherent architecture and light gives

brands a recognisable face – even on the international stage. The lighting design process therefore has to carefully consider the customer, the brand and the architecture. New ideas are also reflected in the light. For example, the notions of curated surfaces and curated light are gaining increasing traction in the retail world. A highly sensitive and distinctly “supervised” presentation of the goods attracts attention, supports perception and makes shopping an unforgettable experience. Light in shops is even borrowing vocabulary from the museum world, with stores now boasting “curators” who are responsible for the perfect fusion of object, light and visitor. According to a publication on the challenges of competition in context of burgeoning online sales, making the brand and retailer more tangible, inspiring customers to buy and exhibiting curated product ranges are the main tasks of stores in the future.<sup>7</sup>

Digitalisation and mobile communication are continually accelerating the pace of product marketing. Differentiation at the point of sale will be possible in the future, especially in the service area. It is therefore necessary to use the opportunities introduced by digitalisation to supplement real shopping experiences with additional services like indoor navigation, which harnesses light in conjunction with the Internet of Things (IoT) to conveniently guide customers to a desired product – an idea that until now has mainly been tried out in large supermarkets. However, even event spaces can exert an emotional influence on visitors through the combination of interactive elements and dynamic light. For example, individuals can use light as an interactive medium by shaping their own spatial and sensory experiences with a smartphone. In the wider context of the Internet of Things, lighting controls and the dynamics of light could perhaps increasingly be regulated by customer frequency, acoustics or movements, for example in a sports shop.

In summary, the study mentioned above concludes that the digital design of in-store shopping experiences will be characterised by three trends, which can all be supported by intelligently incorporating the light of the future:

The transfer of online services to in-store shopping, the development of solutions for the management of customer movements, with the aim of optimising purchase conversion, and the increasing use of digital services to enhance the quality of time spent in a shop.

### **New opportunities offered by LED**

True Gamut Rendering (TGR) LED technology is based on a user-orientated approach. White, light colours and also powerful tones are showcased with unprecedented brilliance and quality. TGRfashion therefore ensures an especially pure representation of different colour shades, as

well as highlighting the specific properties of particular materials.

Active Light can be utilised to blend an appropriate room atmosphere with an authentic perception experience. Static environments appear unnatural and expressionless. By changing the light, the lighting can take into account special requirements like the season, time of day, weather, target group and, above all, specific focus on the products. In addition to the outstanding quality of perception delivered by LED, tunableWhite solutions offer a series of completely new possibilities. For example, changing the light colour in connection with the light direction is an essential requirement for dynamic light. Reddish warm light to cold-white bluish light can be seamlessly adjusted using time controls or simply at the push of a button on the luminaire itself. Tricky filter replacement thereby becomes a thing of the past. The lighting mood is tailored to suit the target group and the daylight situation. Based on years of experience in museum and art applications, subtle nuances and outstanding quality of perception are achieved by matching the light colour to the respective materials, packaging, food types or brand logos. This creates a reliable atmosphere for customers, which has a positive effect on their willingness to buy. A lighting situation that continually delivers new stimuli, as tends to be found in theatre applications, both arouses customer interest and activates the senses. It lets people enjoy truly memorable shopping experiences that increase the likelihood of purchase and lures people back to the store.

### Case study: The Issey Miyake Store in Antwerp, Belgium

The Issey Miyake store in Antwerp, with its straight-lined glass frontage and modern passageway to the inner courtyard, is a charming contrast to the historic facade of the building. The 300-square-metre location is characterised by purism and transparency. Fascinating light effects follow a sophisticated dramaturgy to draw attention to the store outside and to create an inviting atmosphere inside, enhancing customer well-being and encouraging people to stay a little longer.

Even the shop window presents itself as a showroom. Dynamic light with different brightness values seems to indicate that the distinctive Issey Miyake mannequins are in some way moving. Two accent spotlights illuminate each model: one with a spot distribution and one with a flood distribution. The spots are part of the INTRO lighting system, which is integrated flush into the ceiling. A network of motion sensors divides the store into several zones, which tactfully increase the brightness level when presence is detected. The gentle lighting dynamics accompany customers from the entrance and guide them through the defined sections, helping them to really experience the world of Issey Miyake, Japanese fashion designer and founder of the Tokyo-based label. A strong sense of welcome is unknowingly conveyed, leading to



The Issey Miyake Store in Antwerp catches the eye with dynamic and innovative Active Light solutions. High-quality technology and finely tuned presentation make light an important success factor in sales.

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more time spent in the store and greater consumer enthusiasm.

It is also important to present the colours and materials of the collections in an expressive way – which is exactly why the INTRO lighting system is equipped with the aforementioned TGRfashion technology. The LED spotlights boast exceptionally good colour rendering of  $Ra > 95$ , which presents white, light and strong colours with outstanding quality and brilliance. TGRfashion spotlights also help shoppers identify and appreciate different material characteristics.

The deliberate combination of dynamic LED lighting, TGRfashion technology and excellent energy efficiency meets the exacting demands of Gustav Bruynseraede, head of the Issey Miyake store in Antwerp, and was a decisive factor in choosing the INTRO, PANOS infinity and MICROTOOLS lighting systems from Zumtobel.

### **Light for people**

As studies have shown, successful lighting design should always begin with people. Personality traits are being increasingly factored in to provide an element of emotional support. Customer expectations in terms of architecture, design and brand will also now play a key role in the lighting solution. Shopping becomes a real experience, leading ultimately to the establishment of a long-term bond and a feeling of identity with the place of purchase, the brand and the products.

Finally, continuous adjustments to suit customer requirements and growing digitalisation will increasingly shape the atmosphere in a store - and the light. The opportunity to utilise tunableWhite and the innovative potential of LED technology to generate precisely coordinated light scenes offers retailers the chance to fuse human perception with the goods on show. In the future, there will be no longer the right light for shopping experiences, but a series of sensitively adapted lighting scenarios that harness Active Light to deliver the right light at the right time for various different people, brands and products.



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