Multisensory in Stationary Retail: Principles and Practice in Customer-Centered Store Design – Neuromerchandising at the Point of Sale

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Abstract

How do we as humans perceive the sales space in stationary retail and what is the basis for our behaviour? As much as we are proud of our modern shopping places: We cannot overlook the fact that the basic principle of the design of these shopping places has not changed for millennia. What we want to achieve with multisensory in stationary retail is to create an atmosphere in which people feel comfortable, and not just in relation to specific target groups, but to all customers. If you're serious about multisensory in stationary retail, it doesn't make sense to focus on one or two sensory perceptions. But that is often the approach. Most mistakes made in brick-and-mortar retail come from not taking into account the contextual nature of human perception. Only if all elements of multi-sensory perception, such as materials, colours, sound and scent, are in context with each other, can a continuous positive perception be created.

1.1 Multisensor Technology from the Very Beginning

Multisensory in stationary retail sounds very innovative and new at first. Very quickly, the topic is associated with neuromarketing. When I talk to retailers and service providers about this topic, I am often told that they have not yet dealt with it. The question is often whether the findings in the field of multisensory and neuromerchandising could have any relevance at all to their form of retailing. While I know exactly what the point is being made, the question is fundamentally misguided. After all, every retailer or service provider in this world necessarily engages in multisensory. The only question is to what extent one consciously acts on this multisensory.

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The situation is best described with a sentence made famous by Prof. Paul Watzlawick: "You cannot not communicate" (Watzlawick et al. 1969). What does this mean for stationary retail in terms of multisensory? If I specifically scent my point of sale (POS) or let it be, it will smell like something in my store. If I use music or other sound reinforcement, there will be sounds. Even if you don't hear anything, that silence is a communication. Often, even silence affects how people feel in particular. The climate in my business premises affects the behaviour of my customers and employees, because people can only survive with a certain composition of air and within a certain temperature scale.

The earliest documented trade is about 1,40,000 years old and thus older than the emergence of differentiated societies. In the area of origin of humans in Africa, long-distance trade relations over several hundred kilometres could already be proven for this time. At the beginning of trade, when humans were not yet sedentary but roamed the environment, certain prominent points in the landscape were the places where trade took place. These places were natural spaces, such as a ford in a river, a prominent clearing in a forest, or a cave. These places were the first points of sale. As the first Homo sapiens gathered into settlements, they began to shape the environment. As people settled, ritual and religious places also increased. Thus, there are certain places that archaeologists can clearly identify, even after thousands of years, as places of worship and places where people pursued their beliefs. From the first natural religions until today, these places have changed little and still serve as very good examples for the use of multisensory effects.

About 40,000 years ago, the first Cro-Magnon humans arrived in Europe. They demonstrably brought with them a more or less complete program of behaviors that ultimately distinguishes modern humans from every other species on the planet. This was a result of cognitive evolution in early humans. This involved the development of perception of the environment through our senses and interest in particular objects, triggered by attention to a specific event. Through reflection, information was processed in the brain. This information became memories and later a memory store. Most often, meaning was assigned to things and events through language.

The first works of art in the form of engravings, paintings, sculptures and music were created. Body adornment and the development of filigree ornaments on objects of daily use presupposed a knowledgeable handling of various materials by early Homo sapiens. Any kind of trade, especially stationary trade, goes back to this development. The design principles developed in this epoch are still valid today. They form the foundations of modern store design. As much as we are proud of our modern shopping venues: We cannot overlook the fact that the basic principle of the design of these shopping places has not changed for millennia. Add to this another fact: the way information processing works in our brains is demonstrably no different from prehistoric man. When using the most modern technology and communication, we use a brain that received its last update about 1,50,000 years ago.

1.2 Principles of Influence Through Multisensory Technology in Stationary Retailing

Since the publication of my first book "Brainshopping: Emotionalisierung im Handel" (Fringes 2008) I have been dealing with multisensory in stationary retail. In the ideas and methods, I combined experiences from my many years of working in retail and sales with the findings of neuroscience and evolutionary biology. The resulting insights and implementations were often associated with the emerging term "neuromarketing." When I took a closer look at my activities and the applications in retail, I realized that I was not doing classic marketing, but merchandising.

I therefore call the form of merchandising that I do "neuromerchandising." It consists of the two word stems "neuro," which in a broader sense describes certain processes in the brain, and "merchandising." Merchandising is a component of marketing. It involves trying to create sales or accelerate them with product line presentation, design, POS advertising, and packaging design. For me, however, merchandising represents more than just a part of marketing. It is the context of product or service with the place and the way of presentation. There's also the question of the way in which the transmission of information affects the customer's perception. But the context between the product or service and the salesperson as a person also matters. If this context is not right, I as a retailer do not pick up my customers properly. This is a bad prerequisite for a purchase decision.

Neuromerchandising focuses on the perceptions of people at the POS and addresses all human senses. Put simply, this includes all things that people at the POS grasp with their senses and convert into a perception. This applies to all things and events in the room.

Unlike in marketing, there is no specific target group. The target group in neuromerchandising is always the person per se, regardless of whether he or she is in a grocery store, a pharmacy, a hardware store, a shoe store, a bank, an insurance office or a gas station. The basics of neuromerchandising apply equally to every POS and form a kind of statics for the POS.

The book "Brainshopping: Handeln mit allen Sinnen" (Fringes 2010), published in 2010, describes how the different sensory perceptions affect customers, what effect this has and how one can influence the perception and behavior of customers at the POS. Since that time I have experienced contradictory reactions to all forms of neuromarketing, neuromerchandising and multisensory in retail. On the one hand, the effect of neuromarketing and neuromerchandising on customers is greatly exaggerated, on the other hand, it is greatly underestimated.

The various consumer groups and organizations consider the use of multisensory to be too strong an influence on customers and their purchasing decisions. A picture is drawn in which the customer is turned into a will-less object of the trade and the brand industry through the use of multisensory measures. The contradictory nature of the use of multisensory measures becomes particularly apparent when it comes to the use of smells and fragrances at the POS. I was one of the first to equip a supermarket with a scenting concept in a project more than 10 years ago. Especially scenting at the POS is viewed very

critically. There are still strong fears that people are seduced by the subconscious perception of scents. In the meantime, this scenting has been used in other supermarkets for more than 10 years and has not led to customers buying willy-nilly. What scenting has contributed to a successful POS concept is exemplary for what multi-sensory technology wants to achieve in stationary retail: to create an atmosphere in which people feel good, and not only related to certain target groups, but to all customers. Neuromerchandising is based on the assumption that people stay longer and prefer to be in an environment, in our case at the POS, where they feel comfortable than in a place where they feel uncomfortable. The longer stay results in more opportunities to make a purchase decision. In addition, you create a positive memory, which leads to the fact that this environment (POS) is gladly visited again.

To make sure all customers feel comfortable, you have to dig deep into the archaic behavior of humans to certain stimuli in the environment. To stay with our example of scenting: It quickly becomes apparent that it's not fundamentally about scenting, but rather about not allowing negative odors. Because one thing is clear across all target groups: if it smells bad and unpleasant in the environment, I will leave this environment or shorten my stay in this environment as much as possible. The subconscious memory of this negative environment would warn me about these spaces in the future.

In contrast to the self-proclaimed consumer protectionists, who see a threat to free will through the subconscious effect of smells, the majority of stationary retailers do not believe that smells, whether stench or scent, have any influence on customers' purchasing decisions. The reason given is that an effect cannot be measured. They are convinced that products that smell strongly of plastic, for example, have no influence on the purchase decisions of customers at the POS. Both extreme positions completely ignore how humans convert sensory information into perception and ultimately become people's subjective reality.

In order to make a realistic assessment of the effect of multisensory technology in stationary retail, it is necessary, in my opinion, to deal with how perception and consciousness fundamentally develop in humans. The fact that you very quickly reach the limits of human knowledge should not deter you. What science has researched in this area today certainly creates a basis that makes it possible to put exaggerated fears and exaggerated expectations into a different light. Nevertheless, we must be aware that many processes in the brain, such as sensory processing, perception and the generation of consciousness, still pose many mysteries. Science today is still in its infancy in this area. Because of the intense complexity of these processes, it will take a very long time before we understand them precisely, despite rapidly advancing technology. However, the technology of the twentieth century makes many things possible that we considered impossible just a few years ago.

Supported by new technologies, neuroscientists and evolutionary biologists have been able to draw a new picture of humans. Today, they can better and more clearly explain how the brain works and how people behave. However, the resulting facts about how people make decisions (buying decisions) do not lead traders to change their view of people. To

compare it to a physical worldview: The vast majority of traders still believe, with regard to how human brains work, that the world is a disc.

I would like to use an example to illustrate what influencing through multisensory technology means in stationary retail: Imagine that you make a completely independent decision to go to the cinema to see a film. It's a film you've been looking forward to for a while because it's part of a series from which you've seen all the parts so far. You are a fan of these films. So watching the movie has a high relevance for you. Now you come to the cinema and find that there are only small, uncomfortable stools. In addition, there is no ventilation, heating or air conditioning in the projection room. The projection room also houses the toilet facilities, which fills the room with the smell of cloaca. The only thing that is state of the art and state of the art is the screen and the projector. No matter how much of a fan you are of the film, no matter how relevant it is for you to experience the film, you wouldn't last 3 h in this screening room. Even a perfect screen and projection would not change that. Just the lack of ventilation, which leads to you barely being able to breathe, is enough to make you leave the screening room after a very short time.

Well, there won't be a cinema like that. You don't need to understand anything about multisensory to know that it can't work that way. So what's the point of influencing multisensory? To stick with our cinema example: Multisensory would design the perfect environment to the perfect projection, which we could also replace with a product. This would mean in detail: What are the best seats for our cinema? They have to be comfortable enough to sit in for several hours, but not too opulent that you easily fall asleep during the movie. In addition, they should be equipped so that you can easily store drinks and popcorn. The seats would need to be the right size to allow for good sitting, but also not too big to create a sufficient amount of seats to make the cinema profitable. Ventilation, heating and air conditioning should always provide a temperature that is just right for the time of year, which also takes into account that my customers sit in the cinema lightly dressed in the summer and warmer in the winter. In order to ensure all this, we need more precise knowledge about how people perceive an environment and create a perception from it. This subjective perception then gives rise to intentions, emotions and actions.

1.3 Indoors and Outdoors

In the search for what consciousness – and thus reality of the individual – could be, neuroscientists conduct experiments with great technical effort. There, among all the results, one also finds an answer to one or the other question of the trade.

Man is a product of evolution with a distinct drive and instinct system. His cerebrum enables him to reflect this. The evolutionary heritage of man consists not only of his anatomy, bodily forms, organs of movement and sensory organs, it also includes certain preprogrammed behavioural dispositions. Through evolution, however, man has also developed a cerebrum that enables him to control and to some extent direct his libidinal

behavior. For example, even if he is hungry, he can put down his fork. But he can also, when he is not hungry, continue to eat for the sake of pleasure.

In general, in our world, we separate the physical world and the spiritual world very precisely. We can clearly distinguish between what we can see and feel and what we can imagine and conceive. We too readily want to believe what we see or feel because these things seem most certain to us. But the brain brings only a tiny fraction of the really existing world into our consciousness.

The world of our sensations consists of three realms: the external world, the world of our body, and the world of our mental and emotional states. These three realms of reality directly abut or directly merge into each other. All experienced processes between me and my body, between me and the outside world, and between my body and the outside world occur in my subjective reality. Our brain produces our reality comparable to a film being shown to us. This is certainly a very vivid idea. The processes in our brain – in the production of consciousness – are much more complex. The regularity and comprehensibility of the external world has, in the course of evolution, determined our sensory world. Our senses have developed with evolution under the influence of the outside world. Nature's most momentous invention for human development was probably that of consciousness. Although we do not yet know what consciousness is or why we have consciousness at all, we can say what it does: It enables us to build an internal representation of the world and thus experience a stable and continuous reality. It enables us to play through options and plan our actions. Consciousness can quickly and flexibly accomplish what evolution needs generations and stable conditions to do. Moreover, because the consciousness of all people is roughly the same, it allows us to put ourselves in other people's shoes and think hypothetically about their options and plans as if they were our own.

Reality and reality are not the same thing for me. Rather, they are two sides of the same coin. For me, reality is that which is derived from reality through the act of observation. We create the world by observing it. Reality exists within our mind on a kind of screen in our mind. Anything that exists outside of our mind I call reality. We are never in direct contact with reality. We have no choice but to accept a reality to which we humans have no access whatsoever, about which we can only say that there are (presumably) other people, trees and salesrooms.

It is by no means the case that the inner reality is a 1:1 copy of the outer reality. It takes great mental effort and a lot of inner overcoming to accept that our favorite dish doesn't actually taste de facto. It is difficult to think the colors and sounds out of the world. All the sensory impressions can't hide the fact that the world that surrounds us is colorless, soundless, odorless, and numb. The world out there, we must accept, even if it is very difficult for us, is a construct within our minds. Everything we experience with our senses and everything we feel is a representation of information in our brain.

The universe is everything about which we can in principle obtain information. This includes everything that we can observe and measure, and is therefore part of the inner reality. It does not matter whether we use our body as a measuring device with all its senses or measure with measuring devices – this is completely irrelevant. But for the

things we measure with a measuring device – for example radioactivity, which is beyond our senses – we ultimately need our senses again. After all, every measurement also involves recording the result of the measurement with our senses. The universe – and thus the POS – is a reflection of reality in our minds and not "reality itself." And the sales floor is inescapably a part of the universe. The only thing we perceive is our perception. The image of our sales space is never created "out there in the world," but is exclusively a subjective internal matter.

Even if this objective reality is perceived purely subjectively, it is possible to determine whether reality affects other people in the same way. Let's take any desert on this planet: If another person, just like me, experiences the day as very hot and perceives the night as cold, we can assume that this part of the environment or reality affects us objectively. Although reality affects us in equal measures, we still experience it subjectively to a certain extent. The person who lives in a warm region of our planet will tolerate the heat of the day better and find the cold more unpleasant than the person who lives in a colder region. In addition, with better equipment and adapted clothing, one experiences the difference in temperature differently. But beyond this subjective perception, both are warm during the day and cold at night. The environment affects them and that is their reality. Part of this reality, besides the space of the desert, is the human being. He is part of the reality desert and affects the perception. It makes a big difference if I am alone or if there are two of me. If we now replace the objective environment desert with the objective environment POS, we can very quickly grasp what distinguishes the POS from the desert and what does not. In most cases, unlike the desert, the POS is a place or environment designed by humans. We should not expect every person to experience our POS in exactly the same way. To stick with our example of the desert, which people perceive as cold at night and hot during the day, there are differences in perception after all. For example, what is not the same are the individual judgments of this objective world: what do things mean to me? What value do I associate with them? How do I put them into a consistent sensory context? Which object do I classify as dangerous? What circumstances do I long for? And so on. This gives rise to individual and deeply subjective realities. So we should not expect everyone to live in exactly the same world. Everyone has their own world-space with a very individual distribution of attention. There is indeed an objective reality as a basis behind all these subjective evaluations, which is found with the cognitive senses independently of the subjective experience. The spatial arrangement of material things is equally recognizable for all people (and customers).

A display that narrows an aisle in my store affects everyone as part of reality. To continue down the aisle, I will have to walk around the display, no matter what emotional state I am in.

1.4 How Does the World Get into My Head?

Before delving deeper into how a POS affects a customer, it's important to look at how people perceive the world that surrounds them. Specifically: How does the world of my POS come into my customer's perception? But before perception can occur, our brains must first receive information from the environment. Without this information from the environment, there is basically no perception.

For the acquisition of information about the environment, the different senses are responsible, which detect my environment like sensors. Every organism has its own structure for this. With the help of this structure, the signals from the environment are processed and built up into a world of their own. To make this clear, let's take a look at the world of a deep-sea dweller: For many of these inhabitants, the world in which they live is lightless. Light is not present for many of these deep-sea dwellers, even when they are illuminated with spotlights. Light is completely foreign to their system, it simply does not occur in their world. But they cannot be said to live in darkness, for darkness is the antithesis of light. If there is no light in their perceived world, then there is no darkness.

When we talk about multisensory technology in retail, we are talking about nothing other than how Homo sapiens, modern man, the only species of the genus Homo still alive, perceives the world that surrounds him through his brain. "Modern man" here is already a term that can easily be misunderstood. After all, the appearance of the first modern human was at least 1,00,000–3,00,000 years ago. In terms of earth history, it is certainly modern. From today's human perspective, we wouldn't call it modern, whereas sensory perception of the environment is much older. The first single-celled organisms, which are thought to have lived around 3.5 billion years ago, were already responding to their environment, even though they had no organs such as eyes or ears. They were very simple – we would say stupid – because they had neither nerve cells nor a brain. Scientists at the University of Leipzig examined a single-celled organism about 0.2 mm in size on a glass bottom with nutrient fluid under a microscope. There was a scratch on the glass bottom with a maximum depth of 0.1 mm and, by mistake, a glass fragment. The scientists observed how the unicellular organism perceived the glass splinter. It detected an object, picked it up, and waved it around like a club. This means the single-celled organism can perceive and decide because it focused its interest on the glass shard, and later on the scratch in the ground.

From these observations, many scientists are convinced that the sense of touch is the first of all senses and forms a kind of basic sense. The skin is the first organ of contact. The skin holds the inside together and separates it from the outside. Thus the skin perceives its environment. This contact with the inside and the outside is constantly active and determines how we feel. Many of our senses are evolutionary specializations of the skin. For example, the eyes consist of a retina, for hearing we use eardrums in the ears and in the nose there are mucous membranes. For these reasons, many scientists consider the sense of touch to be the largest and most complex of all the senses, with the greatest influence on our thoughts, actions and decisions.

When we speak of human senses, there is no absolutely clear definition of the senses in science. Sense of sight, sense of hearing, sense of touch, sense of smell, sense of taste, sense of balance, sense of pressure and touch, sense of temperature, sense of pain and sense of thinking: this list goes well beyond the well-known five senses we generally talk about in the context of senses. We often quickly forget that the sense of balance, the sense of pain and the sense of temperature have a particularly great influence when it comes to the perception of spaces.

However, on closer inspection, this list is not entirely unambiguous. The sense of touch consists of three different senses: the sense of warmth, the sense of pressure and the "sense of sharpness" for detecting sharp objects. Different types of nerves in our skin are also responsible for this. In addition to the sense of hearing, the sense of balance is also located in the inner ear. The sense of sight is divided into two different senses: the sense of brightness and the sense of colour. When there is sufficient light we use the colour sense, when there is scarce light we use the much more sensitive brightness sense. Hunger and thirst are separate senses that we can call the "sugar sense." Hunger is triggered by the sugar sense. We constantly measure our own blood sugar level and feel hunger as soon as it falls below a certain level. We also have a body sense that allows us to determine the position of our limbs at any time without looking.

The linking of all these senses is ultimately responsible for how people perceive their environment. The combination of all sensory perceptions is an extremely complex process and leads to the fact that each person, with the same information from the environment, perceives something different. If you are serious about multisensory in brick-and-mortar retail, it doesn't make sense to focus on one or two sensory perceptions. But that is often the approach. So when using multisensory it is important to always consider the full range of all sensory perceptions. Of course, it is the case that in different industries and concepts, differentiated attention must be paid to the entire sensory acquisition. It stands to reason, for example, that in a textile store little attention should be paid to the sense of sugar. In contrast, there are areas of sensory perception that are of great importance to all stationary retail concepts. For example, the sense of temperature is of central importance. On this note, I was very often told the cost of ventilation and air conditioning. However, no one has calculated the loss of sales that results from customers avoiding my overheated store on hot days and preferring to go to the competition with air-conditioned sales rooms. In addition, there is another very significant fact: customers can quickly leave my non-air-conditioned sales rooms or even not enter them at all, while my employees cannot. You don't calculate how much concentration, productivity and also the friendliness of the employees suffer from a poor room climate and thus have an impact on sales.

Unlike the example with the deep-sea dwellers, we humans are dependent on light and can therefore clearly distinguish between light and dark. In the course of evolution, humans have adapted to this and developed an internal clock. "Circadian rhythm" refers to regular internal processes that occur over a period of approximately 24 h, such as the sleep-wake rhythm. The human internal clock is controlled by the release of the hormone melatonin, which is usually only produced before and during the sleep phase. Every person's internal

clock ticks differently. Controlled by the brain, the same program runs in the human body every day. The internal clock controls not only sleep and wake phases, but also heart rate, blood pressure and mood. Every cell and every organ has its own rhythm that must be regularly synchronized with the outside world. The light in a salesroom therefore has a special effect on people and their sense of well-being. The biological, visual and emotional effects of light in a salesroom are of central importance for the well-being of customers. With individual settings, it is possible to use light in such a way that the biological needs of customers are taken into account through daylight integration and dynamic lighting control. The technology also allows light to have a major influence on the colour rendering and glare control of illuminated products and product groups. Brightness distribution makes it possible to illuminate different areas of a salesroom in a way that suits the design. Lighting is more than just brightly illuminating the salesroom or answering the question of how I can save as much energy as possible. The rapidly developing technology in the lighting sector will certainly become more important in the future.

1.5 Perception: Truth with Limited Liability

We see, hear, smell and feel into the world and then compare our perceptions with each other. In doing so, we often disagree because we believe that everyone experiences the same thing. However, our subjectively perceived world of things is quite different from the world outside. We experience and describe things differently because we perceive, experience, remember and are sensitized differently. We are not even aware of what excludes, enhances or alters our perception. For example, missing sensory impressions of the world outside, can simply be supplemented or completed by our memories. The existing lack of visual ability is then compensated for by stored experience.

In some cases, information from different sensory perceptions provides information about the same property of an object or an event in the environment. For example, the size of an object can be seen with the eyes and felt with the hand. This is then called redundant information. The purpose of comprehensive perception is to enable action and interaction with the environment that surrounds me. For example, if we reach for a product on a shelf, a complex interplay of tactile and visual sensations of movement is necessary to successfully grasp the product. All sensory information must be combined into a coherent overall impression of the product or action to enable this interaction with the environment. Therefore, all parts leading to perception must always be considered holistically.

The key to stable perception lies in the integration of multiple sensory stimuli, some of which are multiple. Often there is more than a single sensory source that allows one to perceive a feature of the environment. To understand how the different sensory stimuli are used, let us imagine the simple use of a table bell at an information or reception desk of a hotel when we want to summon an employee. For this purpose, the eye (see), the ear (hear) and the hand (feel) provide information about the exact location of the table bell. So you have the three sources of information seeing, hearing, feeling about where the bell is. How

are these sources of information processed together to form a coherent perception of that location? Do we believe the eye, the hand, or the ear? In fact, there is no such selection, but rather all the sensory impressions that are available are utilized and computed with each other. For this purpose, all sensory impressions are first converted into a so-called neural code. This means that the photons falling on the retina of the eye have to be converted into spatial information, just like the sound waves in the ear and the forces acting on the palm of my hand when I press the bell. To determine the location of the hand in space, the position of the head must also be taken into account in order to evaluate the information from the eye and ear. We do not realize how complex it is for our brain to operate a simple table bell. We tap the little nub on the bell and it rings. In order for it to work like that – in addition to processing the information from my senses – we need another important piece of information: my brain needs to know what a table bell is in the first place, and it also needs to know how it works. If you perhaps don't know what a table bell or reception bell is based on the name alone, take a look at Fig. 1.1.

Many can now remember such a bell and how it works. Some even have the sound that this bell produces in their ears. As described in this example, our perception is not only based on information that is captured by various sensory impressions such as seeing, hearing or feeling. In order to interpret the diverse and complex stimuli that constantly affect us, our brain uses prior knowledge that we possess about the world. In our case, the knowledge of what a table bell is and how it works. It is this interplay between momentary sensory information on the one hand and prior knowledge on the other that makes it possible for us to react to our immediate environment.

However, all senses can also lead to perceptual illusions. These illusions are completely independent of human characteristics such as gullibility or intelligence and cannot be eliminated. Based on the information provided by the sensory organs, the brain constructs a hypothesis about the external world and thus determines my perception. In doing so, it follows principles, some of which have proven themselves evolutionarily, others in the course of individual development. Incorrect information processing can cause perception to deviate from a physically explainable and reproducible measurement. The hypothesis

Fig. 1.1 Reception bell

that the brain develops is incorrect and a perceptual illusion results. Optical illusions are a good example of this. A well-known visual perceptual illusion is the so-called Ebbinghaus illusion, in which the central dot is perceived to be of different sizes, depending on the size of a ring of other circles (see Fig. 1.2). Thus, the right central point appears larger than the left one. If we measure the circles, we find that both points are the same size in the middle.

Size is evaluated depending on the environment. Figure 1.3 shows a path along a wall and three people. The person in the foreground appears smaller than the person in the middle. The person in the back appears tallest. However, remeasurement proves that all three persons are the same size. The eye provides the image on the retina, but its meaning is only revealed by processing the image information in the brain. Although the image is two-dimensional, a path is detected that runs from front to back, giving the impression of spatial depth. From this, it is concluded that objects at the bottom are close by and objects in the middle of the image are further away. The person in the foreground appears very small because the distance is interpreted as small. If she were in reality as tall as the person in the middle, she would have to appear taller in the picture. But since it is exactly the same size as the middle person in the picture, the brain concludes that the person should be smaller in reality. The same is true for the person in the back. Instead, it is seen as more than twice as tall.

These images are referred to as optical illusions. Basically, however, our perception is not deceived. Our sense organs and our perception follow unalterable laws and cannot do otherwise. Rather, we deceive ourselves in our understanding of sensory perception. Perception allows us to construct an image of our environment within us. This image, however, can never be complete, since we only possess a limited number of sense organs, which are only responsible for a very limited number of elements in perception.

The light that can be perceived by humans makes up only a tiny part of all electromagnetic waves in our environment (visible light: 400–700 nm). This allows the quality of brightness, colors, depth and edges in space – even in motion – to be recorded. We cannot use other electromagnetic waves – ultraviolet or infrared radiation – although snakes and bees can. We experience similar limitations in hearing, as we can only process sound waves in the range of 20 Hz to 20 kHz. Other ranges are not accessible to us. Other creatures, for example dogs, can detect further ranges with their sense of hearing.

An important area of perception is attention. It plays a central role. Attention determines which information I turn to. Attention determines which information from the total

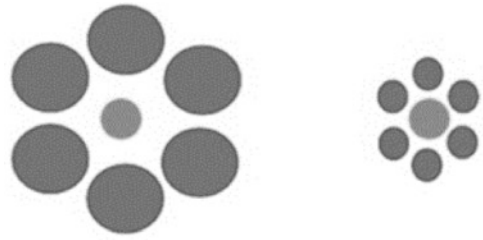

Fig. 1.2 Ebbinghaus illusion

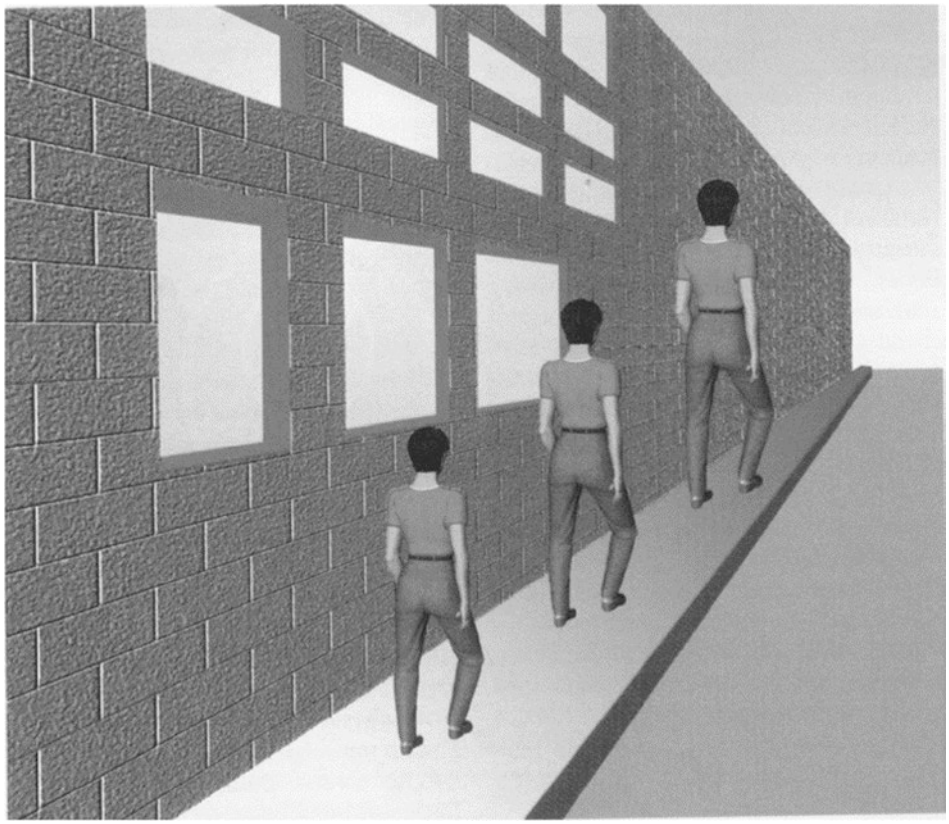

Fig. 1.3 Relative size

number of all available is processed further and it also determines what we learn, remember and think, for example. The outcome of a perceptual process ultimately leads to whether I act or not, whether I enter a business or pass by. The quality of the perceptual process determines what product I turn to or what I ignore. The multisensory data is only one part of perception. My thinking, my memory, remembering and forgetting, and above all, the context in which I perceive my environment plays a central role.

1.6 Context Dependency and Multisensory

Most of the mistakes made in stationary retail are caused by not taking into account the contextuality of human perception. The fact that we always perceive the world, stores and products in context has been more than sufficiently proven in retail. A sports shirt in the context of a brand not only causes the runner to evaluate the product as better than the same shirt without a brand symbol, but actually helps them perform better. It causes the

runner in the branded shirt to run demonstrably faster. The wine from the taverna at my seaside resort was so exquisite in taste that a couple of bottles were taken home immediately. At home in the poorly ventilated living room, the same wine suddenly tastes horrible. What happened to the wine on the trip home? Nothing. Only the context to the environment has changed.

The cheese that is supposedly from the supermarket tastes better than the cheese that is assigned to a discount store. This even when one explains that both samples are the exact same cheese. Here, a context is established between retail form and the quality of the cheese. It is in no way proven that the test persons made a wrong statement, but that the cheese assigned to the supermarket really tastes better in their perception.

The previous chapter has explained what happens here: The taste consists of the ingredients of the cheese, which is produced by the information of the sense of taste. But this is only a part of the total perception. In addition, there is also thinking, remembering and context dependency. If this context is created in this way, the cheese tastes subjectively better to the test subjects and this is decisive for them.

The Online Encyclopedia of Psychology and Education (Stangl 2020) describes an early example of context dependence in commerce. In 1824, Parisians complained about the quality of the fabrics in a renowned textile factory, because the colorful yarns they had been shown in the showroom were not the same as those in the fabrics they had taken home. This difference, however, was not due to the material nature of the fabrics, but to the perception of the buyers. The colorful context in which customers had perceived the fabrics in the showroom changed at home. Because colours always look different when seen on their own than when embedded in the context of other colours.

This shows how important contextuality is in the application of multisensory technology in stationary retail. Only if all elements of multisensory technology, such as materials, colours, sound and scenting, are in context with each other, can a continuous positive perception be created. In this context, it is even better to do without a specifically controlled multisensory measure than to use something that does not fit into the context of the overall perception.

1.7 Principles of Design in Multisensory

Often shops are not judged by whether they are ugly or beautiful, but rather by whether they are harmonious or inharmonious. Often we come to a judgment at the first glance. We enter a shop and say, “Yes, everything fits together there.” We spontaneously perceive shop furnishings and design as uncluttered and inviting or just the exact opposite. Sometimes we are surprised to find that a certain interior is rejected by practically everyone, or another is found to be pleasant by almost everyone. Why is that? That it is perceived this way is because there is a common perception denominator. This includes a distinct perception of order.

If you briefly show people the picture in Fig. 1.4 and ask them which of the two additions is correct in the result, many people say that they could not work it out exactly in such a short time. In terms of the result, both additions are wrong. When they have to choose, by far the majority think the top problem is correct. The reason is that they see a clear order in the upper task.

Another perception denominator are Gestalt laws. Gestalt laws are basic rules for the design of many things and also very important for the design of salesrooms of any form. There are a lot of such Gestalt laws that should be used in the design of salesrooms. However, here I would like to deal only with some examples, everything else would lead here too far.

Gestalt psychology, which developed particularly in the first third of the twentieth century, viewed perceptual phenomena holistically. Its basic ideas can be expressed in one sentence: The whole is more than the sum of its parts. Gestalt psychologists found that we always try to bring the objects we perceive into a meaningful form with a certain structure, harmony and conciseness.

Organic wayfinding in a store has been shown to make people walk slower than a comparable straight wayfinding. Organic wayfinding entices more to stroll in a store. Organic rounded corners on retail furniture suppress the subconscious sense of pain that protects us from sharp objects. Rounded gondola heads make aisles appear wider. But it's equally important to recognize vertical and horizontal lines for orientation in a room. The lack of perceptual right-angled horizontal and vertical lines causes the eye to fail to find a horizon. It can easily make people feel nauseous, similar to the so-called "seasickness."

As an example, a few selected design laws are described below which repeatedly play a role in the construction of sales furniture and product groups (cf. Figs. 1.5, 1.6 and 1.7).

Design laws are just one example of the fact that multisensory in stationary retail is a very complex task. Today, technical developments make the use of multisensory in stationary retail very diverse. It is much easier today to use basic elements of store design in a more differentiated way. If you look at the development of lighting systems as an example, amazing possibilities arise. Today, it is not only possible to illuminate a shop, but also to influence the biology of the customer. The choice of materials for retail furniture and

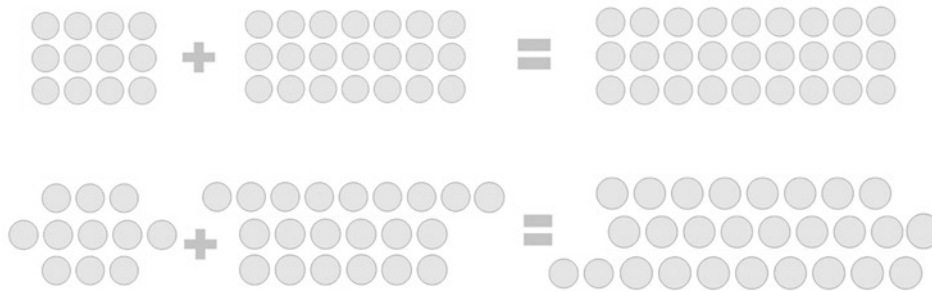

Fig. 1.4 Perception to order

Fig. 1.5 The law of proximity: Elements with small distances to each other are perceived as belonging together

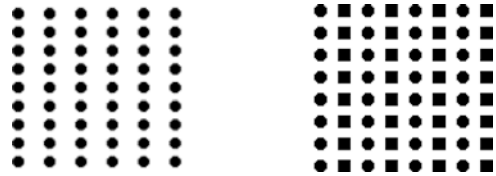

Fig. 1.6 Law of similarity: Elements that look similar to each other are more likely to be experienced as belonging together than elements that do not look similar to each other

flooring has also greatly increased. All these elements have a multi-sensory impact on the customer. When we talk about customer-centric store design, we are talking about customers, and they are and always will be people. Because not every person is your customer, but every one of your customers is a person.

If scientific facts are impressively well established and support the hypotheses, then you would think that most people would be so persuaded by the experimental evidence that they would immediately change their views. Unfortunately, reality shows us a different picture. After all, not only are our customers human, but so are the decision makers in retail. Shopkeepers, general managers, board members and store designers are subject to the same laws of perception as every other human being on the planet. The fundamental need for comprehensive explanation about the world and ourselves is one reason why people stubbornly cling to outdated or foreign-thought ideas. General ideas become deeply embedded in our brains and shape our perceptions. There are still people, especially in stationary retail, who say they don't want to know anything about neuroscience's view of human behavior. They prefer the old fairy tales, even if they are at odds with science. After all, our sophisticated brains didn't evolve under pressure to discover scientific truths. Rather, they were only meant to provide us with the cleverness necessary to stay alive and leave descendants. Moreover, many people consider current scientific knowledge to be ethically inhumane and too difficult to understand.

But if our worldview and evaluations are based on faulty foundations, these ideas cannot succeed in the long run. Without the theories of science, things like electric light, satellite television, and computers would simply not be possible. Without Albert Einstein's theory of relativity, we would not have GPS or satellite and weather imagery. Without Maxwell's equations of electrodynamics, we would have neither radio nor X-ray machines. Without the Schrödinger and Dirac equations in quantum mechanics, we would have neither nuclear spin tomography nor something as commonplace as a cell phone. Experiments prove that many of the inconceivable theories of natural science are correct, even if they elude and even often contradict our world of sense and experience.

Fig. 1.7 Law of closure: Parts of a figure that are not present are supplemented in perception

Multisensory in stationary retailing remains a gamble without insights into the scientific basis of senses and perception. We can determine whether a stationary concept works or not, but we cannot say why this is so.

> "Exact natural science [assumes] that it will always eventually be possible, even in every new realm of experience, to understand nature; but that in doing so it is not at all a foregone conclusion what the word "understand" means […]." (Heisenberg 2018)

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Achim Fringes developer of neuromerchandising®, is not a theoretician, but a rousing salesman of the first hour. Starting as a food retail salesman, his path then led him from coop Dortmund to Kanne Brottrunk, where he managed international sales. As an independent Leonardo retailer with six branches, he then took the step into self-employment. Since 2001, he has been working as a consultant, coach, author and speaker and has brought his neuromerchandising® methodology to the world.