

Fragrance & Feelings Sensory Science













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"Measure what is measurable, and make measurable what is not so." Galileo Galilei

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Section One

Sometimes, in this technological age, we forget that we navigate our lives using our five senses. Primal and instinctive, they are more powerful in shaping perception of the world than any smart technology. However sophisticated we become, scent, taste, sound, touch, and sight shape the way we feel about people, places and products every moment of every day.

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Fragrance; an emotional driver

Sight is the sense on which we most obviously rely. Evolution has honed our abilities to see such that more of the human brain is used for processing images than any other sense. Not really surprising, given our daily dependence on visual information. Hearing too has come to the fore, though not as acute as many animals, we're busy processing audio signals from multiple sources on our journeys through hectic lives.

But have you ever caught a waft of fragrance in the air and been immediately transported to a time or place from long ago? Suddenly you're touring a market in Marrakech, are a child in the kitchen watching your mother cook or exploring a vast pine wood. You can almost feel the wind in the trees and hear the crunch of needles underfoot. For a moment it feels as real as the original experience, such is the power of smell.

Section One

Fragrance; an emotional driver

There is a school of thought that believes that human society has become sensorily deprived. Whilst the analytical senses of sight, sound and taste have sharpened, people have become starved of the more emotional ones. Ours is a society in which touch is neglected as people retreat into their own spaces and smell is something to be controlled, neutralised and even, in the more urbanised environments - removed.

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Sensory experiences bring people pleasure as well as information, a touch can be intimate, or just reassuring, make you feel loved and successful (the building blocks of human well-being). Smell can uplift and trigger an energy boost or be a soothing cue to relax. To understand the value of fragrance you just have to imagine life without it. If the links between fragrance and feelings can be unravelled, a new generation of products will bring sensory as well as functional benefits to make people feel better.

Mood Programme

Givaudan's Mood programme consists of a suite of proprietary research techniques that work synergisticaowerful insights and unique understanding of the fragrance drivers of human mood and emotion.



Section Two



That the sense of smell can unleash powerful emotions is beyond doubt. We are hard-wired to 'remember' when we smell. Receptors located in tissue in the roof of our noses send signals from incoming odours to our olfactory bulb and then straight into our brain. That this connection is short and direct is important. The scent signals are passed quickly to two main areas; the neocortex and the limbic system. The latter is a group of structures deep in the brain that play an important part in regulation of human moods and emotions.

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How smell works

The rapid connection of the olfactory system and the brain's limbic system is the reason fragrance evokes emotion and memories, and explains why the initial response to a smell is often a subconscious one. The first thing a smell does when it reaches us is to drive an unconscious emotional reaction. Only later do we analyse and try to identify what it is. However, smell doesn't work in isolation. When the brain receives odours it's also taking in signals from the other senses at the same time. If the messages are contradictory, the brain will analyse and evaluate each before reaching a conclusion. The correct combination of sensory signals can powerfully reinforce an impression; warm bread smells, feels and tastes fresh. When our senses are working together, there can be up to a one thousand-fold amplification of the signal. "A hint of peppermint incorporated into the office environment may increase employee alertness, performance and attitudes toword their jobs"

Drs Joel Warm and William Dember University of Cincinnati

Section Two

How smell works

So smell is not only a phenomenon of the emotional and memory centres of our brains but is always part of a multi-sensory experience.

That it has an effect is undisputed. Finding programmes. Responding to the environments in which we live, genetic make-up and upbringing fine-tune the olfactory gateways. Our very efficient brains shut down the olfactory gateways for smells that are constantly experienced, adjusting the wiring in the brain to process new smells and edit out familiar ones.

After all, there's not much point in continuing to be overwhelmed by the smell of garlic if it's been identified and proved not to be a threat. each of us, honed by day-to-day experiences. These environmental and cultural differences clearly need to be understood by our perfumers because together they pose some questions things differently, how can we have a consistent vocabulary to communicate what sort of smell we

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Section Two

How smell works

always describe an apple as having a fruity

perception and behaviour. Only then can we help design products people love. Striving to gain this and map this fascinating sense we call smell, the

Sensory Scientists Working in Givaudan

We have both experienced Sensory Scientists and Psychologists conducting sensory analysis at Givaudan. Together their work includes measurement of the perception of fragranced products, fragrance ingredients and compounds as well as experimental psychology and neuropsychology programmes to measure emotional and behavioural responses to odour

We have worked closely with many academic experts working in the field of olfaction including Dr. Charles Spence (University of Oxford), Professor Gemma Calvert

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(University of Warwick), Dr. Steve Van Toller (Warwick University), Professor Egon P. Köster (Utrecht University), and Professor Qing Yang (Penn State). These collaborations have furthered our understanding of human responses to fragrance through studying psychophysical measures, mood, emotion and neuropsychology, and contribute to the output of our current research programmes.



Section Three



Measuring emotion

In the context of using fragrance, emotion means wanting to feel relaxed, invigorated, happy, good about yourself and attractive. The sense of smell is complex, however, its workings elusive and its effects emotional - how can we begin to understand what a person means when they describe a smell as 'relaxing' or 'invigorating'? Or more than that, given that there is something almost primal about our sense of smell, are words enough to describe fragrances anyway?

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Capturing Moods

Our approach has to be to find complementary ways to capture the labyrinthine links people make between fragrance and emotion. Sensory Analysis and Market Research are two major disciplines that enable measurement of human responses to sensory stimuli. Both rely on well researched, rigorous techniques and a fundamental understanding of the variability involved in working with people, and the results can be used synergisticly.

Sensory analysis uses human subjects as a measuring tool, measuring their reactions in a precise, descriptive way to characterise the stimulus, while the evaluative and subjective associations made by the consumer can be understood using Market Research techniques. Combine the two with powerful statistical techniques and the odour relationships between different products or perfumes can be quantified and the results enable the subjective associations to be interpreted as an odour.

In effect, we've created a range of research tools that measure feelings.

Section Three

Capturing Moods

Miriad

Miriad is a vast global database that gives insights into how people relate smell to the other senses and is based on pioneering thinking about consumer understanding. We've been adding layer upon layer of research content since 1989 to create a reference library that explores and measures the emotional content of fragrances in tremendous depth.

One of the tools in Miriad is Perfume Pulse, which uses only consumer language – in all its freeform richness to explore what people think and feel when they smell a fragrance.. The revealing results show how different types of 'happy' smell and that there are many types of 'invigorating', 'relaxing' and 'sexy' which change over time. But moods are not one-dimensional things. In fact, one person's idea of relaxing might well be comprised of surprisingly energetic references, when another will enlist only lethargic terms. This is because some people relax by skydiving, whilst others prefer an armchair.

Miriad helps us capture the whole range of emotions that people experience within a mood.

Through Miriad we know what people in France think Mediterranean red smells like, what colours they would use to make it and how it might feel to touch. Or we can look at things from another perspective and tell you what colour an existing perfume is in people's imaginations. Not only does this give our perfumers a reservoir of inspiration, but it can also influence product design in terms of texture, packaging and the language used to promote it.



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SENSORY PANEL

The sensory panellists selected by Givaudan are trained to identify important fragrance characteristics. They are not professional in the same way as perfumers or fragrance evaluators, but are selected members of the public who are trained to identify and verbalise their perception of an odour. All assessments are carried out in a purpose built Sensory Suite that is designed to exclude distractions such as external noise, other odours and movement. There are more than 60 panellists and analysis sessions are run every working day. Assessment by the Sensory Panels enables Givaudan to investigate the perception of olfactive difference, odour strength, malodour management and to quantify odour characteristics. 79% of women and 86% of men think that smells can lead to romance NEW York Times Survey 1995 Section Three

Capturing Moods

Mood odour mapping

We are intrigued by what people feel when smelling a fragrance. Our research measures their responses, helping to translate their feelings by asking them to use scales to tell us or sometimes asking them to associate a smell with an image. We transpose our research findings through cluster analysis to find the similarities and the differences and use this knowledge to create mood maps for odours. These are incredibly useful because they allow us to plot fragrances around a wide range of reference points. These points are verbally generated descriptions of moods evoked by odours - again based purely on consumer response.

So for example, we can take two potential fragrances for a luxury, indulgent body wash ask consumers to describe how they make them feel and plot them on our map.

We might find that one fragrance is perceived as having a predominantly floral rose smell, whilst the other is more towards floral jasmine. We can then overlay mood research and find that rose evokes happy feelings, whilst jasmine is more comforting. So although we start with what appear to be similar fragrances (both luxurious, both floral) they'll contribute very differently to the success of a product which is designed to give us an overall feeling of pleasure and well-being.

This kind of mapping has also allowed us to explore more fully differences between cultures and geographies. If citrus notes are refreshing in the US and Germany, they're relaxing in France. Apparently this is because the French tend to use a citrus cologne on babies after their bath. So that the French grow up associating this smell with reassuring memories. Again, that link between smell and memory surfaces.

Mood portraits

Whilst the language captured in the research in Miriad is wonderfully rich, it still represents a considered response. It's also one which is shaped by past experiences and the different environments in which we live.

A Mood Portrait is our unique way of finding deeper links between fragrance and emotion by eliciting more spontaneous responses. We do this by bypassing the need for words and use images instead. We've found that it provides a more comprehensive and flexible picture of how a smell evokes a mood, and what that mood looks like.

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Whilst we all struggle to describe smells using our limited vocabulary, we're much more comfortable with visual descriptors. Moreover, the useful thing about this profiling technique is that whilst it's spontaneous, it's also measurable. Most research tools dealing with mood and emotion are qualitative. This is quantitative so we can edge further towards being able to deal in absolutes in this world of fragrance and feelings.

Mood Portraits

This is a quantitative technique that uses visual images to measure mood and emotions associated with fragrance. This technique elicits a more spontaneous response as it bypasses the need to use words.

Mood Odour Mapping

Quantitative technique to measure mood and emotions experienced when smelling fragrance that provides understanding of local, regional and global differences and similarities.

Section Four

"Our emotional, physical and even sexual lives are profoundly shaped by both our reactions to and interpretations of different smells."

Rachel Herz Monell Chemical Senses Center





Advanced subconscious research techniques

We're proud of Sensory Panels, Miriad, Mood Mapping and Mood Portraits. They're groundbreaking tools that deliver revealing results. But what if we want to take things a step further? What if we want to bypass the subjective world of people describing verbally and visually how smells make them feel and get straight to the heart of the matter?

Brain imaging

Well we think we're there. Using brain imaging technology we can unveil both the conscious and subconscious responses of the brain and concentrate on the parts that respond to odour stimuli. We're able to look at the direct connection between an odour, our brains and the effect that it has on us physically and emotionally. No need for people to tell us how they perceive a fragrance because we can see the story unfolding inside their heads.

The technology we're using is based on EEG (electroencephalography), which is a way of measuring delta, theta, alpha, and beta waves. Which of these are passing a particular area of the brain at any given moment speaks volumes about what's going on there. Now although EEG isn't new technology, the way we're using it to link fragrances and mood is.

What we know for the first time is whether, when a fragrance (which someone states categorically is relaxing) hits the brain, it actually does relax the body and trigger the appropriate sense of well-being.

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Off the Top of Our Heads

For instance, in our mapping programmes German respondents told us that by and large, a chocolaty smell wasn't relaxing. However, our brain imaging told us otherwise. Chocolate smells are alluring, reassuring and relaxing for British, French and Germans alike. In fact, when we've done more brain imaging we wouldn't be surprised to find out that something most women have known for centuries is a universal truism

So brain imaging is the answer to removing the subjectivity and the tendency to associate one odour with another that impairs our ability to describe smells.

In short, we're measuring the distances between perception and reality. In so doing, we're in sight of that elusive goal of knowing absolutely how to harness the power of fragrance.



Section Five

Researchers have found that our ability to recall a specific scent surpasses even our ability to recall what we have seen.

Dr Trygg Engen Brown University





Why do we want to create emotional fragrances?

The power of fragrance to move us is a phenomenon that we're only beginning to fully appreciate. And just in the nick of time since our modern preoccupation with all things visual and audio is fast proving to be misguided. Even love, it would seem has less to do with cupid's arrow and more with how our senses respond to each other. Finding your soul mate is only partially a question of intellectual or physical attraction. It's probably more a meeting of chemical signals emitted through the skin. Romantic isn't it?

Some of the most important decisions in our lives are being made at a primordial, subconscious level driven by our senses. On a more mundane, day-to-day level, the products we choose to surround ourselves with are also influenced by how our senses perceive them.

We know that people will recall products by their smell. But the power of fragrance to place brands in people's emotional lives has not been fully appreciated. For instance, astonishing as it seems, people in the UK are more likely to correctly identify the reassuring smell of Johnson's Baby Powder than that of a lemon.

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Sensory Superpowers

Our knowledge is expanding all the time. We're already creating evocative, original fragrances but now we're pushing the boundaries of research too. We're discovering new pathways from fragrance to emotion and mapping them. The importance of this is becoming ever more clear.

To acknowledge the importance of investing in our senses is a major step to enhancing human well-being. To understand how to use fragrance and the sense of smell to connect people to products is to become one of the sensory superpowers of the future. Givaudan leads sensory innovation.





