

The Relationships Between Emotion, Perfumes and Fragrances

By Steve Van Toller, University of Warwick, Coventry, United Kingdom

In the booklet *The Forgotten Nose*, published in 1984 by the Fragrance Foundation, New York, there are a number of quotations which suggest a special link between emotion and the sense of smell. In this publication, Cain draws attention to the connections between the olfactory tissues and "the part of the brain that deals with emotion." Groupy is quoted as saying, "the sense of smell has powerful and direct connection with our emotions, more so than any other sensory system." There are other quotations in this interesting publication which link emotion and odor.

Similarly, reading the general literature on perfumery we find remarks suggesting a special relationship between emotion and perfume. However, despite such statements, there have been few actual suggestions as to how emotion and olfaction might be linked. However, there are a few clues and I feel that we can move towards looking to see how the sensory systems of olfaction and emotion come together.

A good place to begin to understand smell and emotion is with the insightful novel by Suskind (1985). This book presents its readers with an opportunity to discard, or at least begin to reduce, Homo sapien's visual bias. Suskind's story is about a human freak, called Grenouille, who possesses a phenomenal olfactory ability. Like an animal, Grenouille is able to remember the olfactory imprint of everybody he meets. Immediately he is able to discern mood and likely actions by a person's smell. This amazing book should be read by everyone concerned or interested in smells. However, it is a work of fiction and imagination, and one might question if it could happen in reality.

By one of those strange coincidences, a psychological account of a human experiencing an enhanced sense of smell has been published by Sachs (1985). Sachs' clinical case is related in a chapter called "The dog beneath the skin" and it concerns a bizarre incident which happened to a New York medical student. Stephen D, aged 22, had been experimenting with drugs to produce "highs."

One night Stephen D vividly dreamed that he was a dog,

experiencing a world "unimaginably rich and significant in smells." On waking, he found that he actually retained this amazingly acute olfactory ability. He found that his other senses were also enhanced but to a more limited extent. For example, he found his leather-bound books "(which) looked similar before, now had quite distinct and distinguishable hues." He experienced a dramatic eidetic visual perception that enabled him to project anatomical things he wished to draw on to the paper, and he merely needed to trace the projected outlines. But it was his sense of smell that was transformed with a magical redolence.

Stephen D found himself living in a world where "all other sensations, enhanced as they were, paled before smell." Linked with his enhanced sense of smell, "there was a sort of trembling, eager emotion, and a strange nostalgia, as of a lost world, half-forgotten, half-recalled." Recalling a visit to a perfume shop, he said, "I never had much of a nose for smells before, but now I distinguished each one instantly—and I found each one unique, evocative, a whole world."

He went into the hospital clinic and sniffed, and later writing about it said, "In that sniff recognized, before seeing them, the 20 patients who were there. Each one had his own olfactory physiognomy, a smell face, far more vivid and evocative, more redolent, than any sight face."

He found that sexual smells were exciting and increased in terms of meaning but not more so than food and other smells. During this episode of acute olfactory awareness, he found that pleasant smells were intense and unpleasant smells less so.

Suddenly, after a period of three weeks, Stephen D lost his sensory acuity and his senses returned to normal. He said that he was glad to be back but nevertheless missed his redolent phase: "I am glad to be back, but it's a tremendous loss, too. I see now what we give up in being civilized and human."

He was an intellectual and reflective person, prone to abstraction and categorizing things, but during his enhanced sensory acuity he had felt no need for his human cognitive abilities. During the transformation, his sense of smell told him all he needed to know about the world. There was no need for his cognitive abilities as everything was marked

Much of the material presented here was first prepared for a review on Emotion and Odours commission by Quest International, Ashford, Kent, UK. Although the help given by Quest is gratefully acknowledged, the author is responsible for the views expressed.

and clearly identified by his smell sense. In short, abstract thought and intellectual abilities were redundant.

We should be very grateful to Oliver Sachs for bringing to our attention this interesting and illuminating clinical case. It begins to explain how with the evolution and refinement of the other sensory systems, plus the developing cognitive abilities, humans lost their dependency on the phylogenetically old sense of smell.

We might wonder if this could be the basis for the human "expulsion" out of the Garden of Eden? Was there a point in time when the sense of smell of *Homo sapiens* became overridden by other sensory and cognitive brain circuits? At this juncture, could there have been a vague remembrance of an older, more carefree, halcyon period in human development? A time when thoughts and cognitions were not paramount?

By this I am not meaning to imply that the sense of olfaction has been forgotten or reduced to an irrelevancy. The sense of smell was too important as a sensory system to be left behind as a mere hindbrain reflex and was transformed by the newer brain circuits into subtler forms.

In terms of its evolution, the olfactory sense seems to closely parallel changes undergone by emotion. Animals use the olfactory sense to gain precise and specific information about the world; they have no use for the sense of smell as an esthetic sense. As Stoddart (1988) has pointed out, humans have a long history involving the use of perfumes and fragrances as esthetic experiences.

To set the study of emotion into context, we must remember that the origins of emotion lie in the biological past of *Homo sapiens*. We must remember that for 99 percent of human history, humans have been hunters and food gatherers. If the life of the planet we inhabit is reduced to a 24-hour time span, we find that human life began about four seconds ago.

Archaeological records of humans go back some five million years, but the subsequent development of urban and primitive industrial life has occurred within the last 12,000 years. This means that the social fabric we take for granted is relatively new in terms of human evolution (Maxwell 1984).

It has only been just over a century since the Industrial Revolution, which replaced human dependence on muscle power by machinery. Within our own lifetime we are experiencing the commencement of the computer revolution, which is beginning to supersede many of the routine cognitive aspects of the human brain.

The popular view about emotions is that they are lower-order feelings and behavior that humans would best be without. This view stems largely from the philosophical school of the rationalists. Reason was held by Descartes to be a specifically human attribute as opposed to the emotional or non-rational and instinctive behaviour of the lower animals. However, not all philosophers held this view; for example David Hume wrote, "reason is the slave of passion." But the rationalist position predominated, suggesting that animals expressed the purest form of emotion with humans

having, at least partially, overcome the limitations produced by emotion via development and cultivation of their rational faculties.

Does the account by the rationalists present a true picture of emotion and its role in human behavior? The first point is that it is to humans that we must look to see emotion in full flower (Van Toller 1976). By comparison with human emotions animals reveal a pale imitation. It is in humans that we see the complete emotional range from its most ugly to its most beautiful.

Therefore, I would argue that emotion is as much a part of the highest intellectual achievements among *Homo sapiens* as it is of the most diabolical acts. In the work of genius, we find a perfect synthesis of the emotional and intellectual components with neither being sufficient by themselves. Intellectual achievement devoid of emotion is easily recognized as a pallid form of intellectual imitation. It is, therefore, a fallacy to suppose that at some point in the future humans will undergo a metamorphosis and shed their ugly skin of emotion to reveal the beautiful inner skin of pure rational thought.

Emotion, like olfaction, although a phylogenetically old brain system, was too important to remain as a simple reflex mechanism. Each subsequent evolutionary development of the brain resulted in emotional systems being carried through into the developing areas. Each subsequent stage resulted in emotion being transmuted into new and subtler forms.

During the early part of this century, there were many attempts by neuropsychologists to find the locus of emotion in the brain. These attempts were all doomed to failure because emotion is represented in all the behavioral systems of the brain. Human motivational systems of hunger, thirst and sex have undergone similar, though less dramatic, change and refinement.

It is in humans that we find eating and drinking replaced by rituals of dining; similarly, human sexual activity may take exotic and deviant forms. The point is that although the basic functions of emotion and motivation still have their primary modes of action in their original brain structures, they have come to take on new behavioral dimensions which arise from additional circuits in newer areas of the human brain.

Both olfaction and emotion are, to a large extent, dependent upon individual learning. There appear to be few primary biological emotions, but many secondary or learned emotions (Van Toller 1976).

Another complicating factor is that, to a large degree, emotion is ignored in the educational processes. Indeed, as Ruckmick (1939) pointed out a long time ago, children are taught that intellectual ideas should be divorced from emotional ideas. We find that olfaction is similarly ignored by educational processes.

To put this into context, we must contrast olfaction with the emphasis both parents and formal schooling situations will place upon the learning of color names and, to a lesser extent, the naming of sounds. We find the same ignorance reflected in the perfume industry, which, in general, shows

a marked reluctance to educate the general public about perfumes and fragrances. Presumably it is felt that if the mystique is removed, the interest will be killed. The reverse appears to be true judging by the attempts that have been made to educate the general public in New York (Green 1988). Hopefully, this trend will continue.

The studies on the brain have revealed the limbic system as an important and complex set of structures and pathways in the brain relating to emotion. Interestingly, the limbic system was originally known as the rhinencephalon, or the smell brain. It was Broca, the French anatomist, who in 1878 renamed it "le grand lobe limbique," when he realized that the dolphin, although having a well-developed limbic system, possessed little or poor olfactory ability.

The system consists of a complex inner ring of brain structures, below the cerebral cortex, arranged into 53 regions and 35 associated tracts (Watts 1975). A brief consideration of the number of possible combinations and interactions that could be involved will demonstrate the limbic systems potential for playing an important role in emotion and personality. A major function of the limbic system is to combine and orchestrate the many parts of the brain.

Watts (1975) stated that a major function of the limbic system was to interpret the total sensory input into the brain as either "pleasant" or "unpleasant." After evaluating input in terms of "innocuous" or "dangerous," the limbic system makes instant decisions and directs the resulting integrated somatic and sensory activity. We can see how the sense of smell comes to parallel the emotions.

I have recently reviewed the published English scientific literature in an attempt to discover what links had been forged between olfaction and emotion (Van Toller 1985, 1988). Early psychological studies involving emotion and odor were related to the hedonic or the relationships between pleasant and unpleasant smells. The hedonic dimension was originally thought to be a single continuum with pleasant and unpleasant aspects located at opposite ends. However, the early psychological studies that tried to find a simple relationship between odors and hedonics overall failed.

It is at this point that we need to consider an important set of conclusions about emotion. These were made by Schachter and Singer (1962) who reported a series of experiments that were to have a profound effect on social psychology and to provide a basic framework for a social/cognitive theory of emotion.

Their basic experimental design involved subjects injected with adrenalin or an inactive (placebo) substance. Subjects taking part in the experiment were divided into three groups. The placebo-injected subjects served as the control group. The second group was informed about the physiological consequences of being injected with adrenalin, which is an autonomic nervous system arouser. The final group was told that the injection was a vitamin substance related to visual acuity.

All subjects were told that they were about to take part

in an experiment concerned with vision; however, before the start of the study, subjects were asked to fill in a questionnaire. These were designed to evoke different types of emotions. In addition, while completing the forms the subjects were placed in social situations designed to arouse emotional reactions. This was achieved by having a "stooge" filling out a similar form but acting in a prescribed way. For example, if the situation was designed to evoke happiness, the stooge acted in a happy, silly manner. At the other extreme, a set of forms asked impertinent questions and the "stooge" acted in an angry manner. Thus, the subjects were primed to produce certain emotions in response to injections of the adrenalin.

The conclusion from these studies was that subjects who had received injections of adrenalin, and who had been told the true consequences of the injection, tended to respond with more emotion than subjects who were given an injection of adrenalin but not told of the true consequences. In marked contrast, the placebo group were said to have experienced little emotion. Schachter and Singer argued that their subjects were aroused by the injected adrenalin and attributed the induced feelings to the social/emotional setting they found themselves in. This cognitive theory of emotion is called the "attributional theory of emotion" and many further studies have been carried out since the original investigation.

Clearly the studies outlined above showed that the social setting was an important determinant of emotion. If we turn our attention to olfaction, we see that a perfume can evoke emotion in a similar manner. A beautiful perfume will elicit the learned response of turning around to look for a beautiful woman.

Perfume also has another emotional role because, in addition to the social setting, another important determinant of emotion is change of sensory perception. We have only to think of the generation of fear and anxiety in fairground rides or horror movies to realize the significance of this statement. Solemn music together with a solemn occasion will invoke appropriate feelings of sorrow.

Heath (1986) has also pointed out that emotion is associated with a change in sensory perception. Thus we can begin to explain and understand the relationship between perfume and emotion. Perfume, or for that matter any olfactory stimulus, is likely to evoke an emotional response, though of course the response may be slight. The response may also depend upon the internal physiological states. For example, the smell of food cooking before a meal may provoke pleasant hunger feelings, but after eating a meal the same smell may become aversive.

Engen (1988) has shown that reactions to smells are learned. Up to the present time, no hard-wired reactions to smell have been reliably demonstrated. In *Homo sapiens* the reactions to odors are all software or learned reactions.

Perfume, in most cases, will evoke pleasant or sensual responses because these are the responses that are mainly associated with perfume; however, this may not always be the case. Allergies apart, a person may have learned an

idiosyncratic response to a particular perfume.

It is also a fact that children tend to dislike the smell of perfumes because they are too sophisticated for the young, who lack esthetic appreciation. If children do like perfume smells, they tend to prefer single notes or simple floral perfumes. There is, of course, the added complication of children learning aversive reactions to perfumes. The smell of perfume in the home can mean that their parents are going out for the evening. Also, unfortunately, boys often learn to consider fragrances as effeminate and something to be disliked.

Perfumes are sophisticated mixtures of chemical compounds with marked effects on human esthetic sensory experiences and as suggested above, they evoke emotion.

When I test my domestic animals using a perfume, their responses are best described as quizzical. They can detect the smell and track down its source but they are not interested in the smell of a fine fragrance. For animals, as pointed out by Harder (1984), smells must evoke clear-cut significances; they must have a biological message. The animal world has no place for fine fragrances, although ironically basic animal smells are often important base elements in the finest fragrances.

To return to our example of perfume and emotional

response, suppose we encounter a strong and powerful perfume, one in which a lot of "personal space" is being created by its user. We look around in an attempt to locate the source, and see a beautiful film star. This will evoke emotions relating to beauty and perhaps allurements. Let us turn the situation around and suppose that we are visiting a zoo where we encounter a water buffalo not displaying its usual (to our human noses) foul smell, but the beautiful "film star" type of smell. In this situation, it would be our turn to look quizzical and, most likely, the incongruity of the situation would produce laughter.

The woman who applies a perfume or the man who splashes on aftershave in the morning, may be doing it for a number of reasons. However, if you ask people why they apply perfume or fragrances, you will often be told that "it makes me feel good." The application of perfumes and aftershaves comes at the end of the toilette and it appears to be used because of its emotional effect of evoking well-being. In other words, it is being used for its sensory role. The initial smell of the fragrance will invoke good feelings and pleasant emotions. For the rest of the day its effects will largely be ignored and unnoticed by the wearer but others will be affected by the fragrance.

References

- Address correspondence to S. Van Toller, Department of Psychology, University of Warwick, Coventry CV4 7AL, United Kingdom.
- T Engen, *The acquisition of odour hedonics*. In: *Perfumery: the Psychology and Biology of Fragrance*, S Van Toller and GH Dodd (Eds), Chapman & Hall, London (1988)
- A Green, *Fragrance education and the psychology of smell*. In: *Perfumery: the Psychology and Biology of Fragrance*. S Van Toller and GH Dodd (Eds), Chapman & Hall, London (1988)
- U Harder, Physiological/psychological background to the reaction to fragrance. *Contact*, **32**, 14-22, Haarmann & Reimer house journal (1984)
- RG Heath, *The neural substrate for emotion*. In: *Emotion: Theory and Research, Vol 3. Biological foundation of emotion*. R Plutchik and H Kellerman (Eds), Academic Press, New York (1986)
- M Maxwell, *Human Evolution: A Philosophical Anthropology*. Croom-Helm, London (1984)
- I Ruckmick, *The Psychology of Feeling and Emotion*, McGraw-Hill, New York (1939)
- O Sachs, *The Man who Mistook His Wife for a Hat*. Duckworth, London (1985)
- S Schachter and J Singer, Cognitive, social and physiological determinants of emotional states. *Psychological Review*, **69**, 378-399 (1962)
- DM Stoddart, *Human odour culture: a zoological perspective*. In: *Perfumery: the Psychology and Biology of Fragrance*. S Van Toller and GH Dodd (Eds), Chapman and Hall, London (1988)
- P Suskind, *Perfume. The Story of a Murderer*, Hamish Hamilton, London (1985)
- S Van Toller, *The function of human emotion*. Open lecture, Univ of Warwick, private circulation (1976)
- S Van Toller, *Odours and emotion*. Review prepared for Quest Internation, Ashford, Kent, UK (1985)
- S Van Toller, Odours, emotion and psychophysiology. *Intl J of Cosm Science*, **10**, 171-197 (1988)
- GO Watts, *Dynamic Neuroscience: Its Application to Brain Disorders*, Harper & Row, New York (1975)

