



Book Review

The Scent of Eros: Mysteries of Odor in Human Sexuality. By James Vaughn Kohl and Robert T. Francoeur. iUniverse Inc. 2002. ISBN: 0-595-23383-X.

Reviewed by Mark Sergeant

In many non-human species odours play an important role in regulating social behaviour. They can signal the social status of an individual, affect reproductive development, instigate mating behaviour, and be used to identify kin in a variety of species (Preti et al, 1997). One example of this is the release of androstenone in the saliva of boars to instigate sexual presenting behaviour in sows (Kirk-Smith et al, 1978). While odours are seen as important in many species, humans are believed to rely more on their superior visual skills and linguistic abilities (Maxwell, 1984). As a result of this, research on the role that odours could play in human social behaviour has been relatively neglected compared to studies on other sensory inputs, particularly vision. In recent years however, there has been considerable speculation over the role that odours may play in human behaviour (Wyatt, 2003).

Beginning primarily in the early 1970's, an increasing volume of research has examined the human behaviours odours could influence, and the degree of influence that is exhibited. Interestingly it appears that odours are able to play a significant role in affecting our reproductive

behaviours, particularly the process of interpersonal attraction (Kohl et al, 2001). Substances present in human body odour can facilitate social interactions by maintaining positive mood (Jacob & McClintock, 2000) and even signal Major Histocompatibility Complex (MHC) characteristics that are essentially a marker of a person's inherited immune system (Wedekind & Furi, 1997). Individuals select a mate who possesses different MHC characteristics to their own, as a means of avoiding inbreeding (kin have similar MHC characteristics) and/or to provide offspring with more varied immune reactions (Penn & Potts, 1999)

However the findings within the field of olfaction research are often contradictory and open to criticism. Many of the earlier studies from the 1970's and 1980's are criticised on methodological grounds for having insufficient sample sizes, inadequate control groups, a lack of ecological validity and poor control over extraneous variables (Stoddart, 1990). While these issues have been addressed in more recent research, there are other issues to consider. Many of the researchers in the field of human olfaction go on to form commercial organisa-

tions that are involved in the production of synthetic odours, which it is claimed can also have pronounced effects on behaviour. Due to the commercial interests of these individuals, it is feasible they could favour research findings which support the supposed effects of their products. An example of this is research on the human vomeronasal organ (VNO).

In many animal species the VNO forms part of an accessory olfactory system that plays an integral role in pheromone-related behaviours. Some researchers from a more commercial background are keen to cite studies that found a VNO in a high percentage of human participants (Garcia-Velasco & Mondragon, 1991; Stensaas et al, 1991) working on the basis that VNO equals pheromones (Meredith in Ben-Ari, 1998). However the human VNO is strongly debated, with many researchers locating this organ in comparatively few adult participants (Won et al, 2000; Johnson et al, 1985), and some indication it may be confused with the nasopalatine duct (NPD), which connects the nose and mouth (Jacob et al, 2000).

The VNO example does *not* suggest that the work of every researcher with a commercial orientation should immediately be called into question, but instead serves as an example of how individuals in the field of olfaction research can have conflicting views that may mislead the uninitiated. In order for an individual to form their own opinions regarding olfaction research they quite often need specialised knowledge in the areas of biochemistry, endocrinology, neuroanatomy, and physiology to evaluate the studies for themselves. Given that this may not be the case, the most accessible way for a general audience to engage the subtleties of this literature is through a review of the whole area of research, such as the *Scent of Eros*.

The Scent of Eros

The goal of this text is to introduce the reader to how odours relate to human social behaviour, particularly its connection to our sexuality. This is achieved through 14 fairly short

chapters, which are essentially a reprint of the material from the first edition of the text (published in 1995). In addition there is a recently added epilogue that is designed to introduce the more recent developments within the field of olfaction research. In some ways this information would have been more satisfying if it had been integrated into the main body of the text, as some of the ideas considered in the first edition have been directly addressed by more recent research. For example, the authors originally considered that MHC characteristics expressed through body odour might be involved in discriminating between individuals (p 32), a finding that is now supported by research they cite in the epilogue (p 289). However the current format does provide a form of 'then and now' snapshot, allowing the reader to see the original ideas of the authors, and then discover both the developments within field, and how successful the author's predictions were.

The text itself covers a broad range of topics, such as the production of artificial odours and perfumes, how certain conditions such as (Kallman's Syndrome and Turner's syndrome) can affect the detection of body odour, and the neural and hormonal mechanisms that mediate odour related behaviour. To summarise this last point briefly, pheromones are supposed to stimulate the release of gonadotropin releasing hormone (GnRH), which both acts as a neurotransmitter and stimulates the release of luteinising hormone (LH). LH in turn stimulates the release of testosterone via the pituitary gland, which then has subsequent behavioural effects. This information is portrayed in such a way that a more general audience can follow the line of reasoning, quite an accomplishment given the complicated nature of neuroanatomy and endocrinology.

This scientific approach to the research is also complimented with interesting anecdotes and speculative reasoning to illustrate particular points; such as the preference that Napoleon demonstrated for the body odour of Josephine, or the practice among some Mediterranean cul-

tures of using *love apples* (a slice of apple placed in the armpit to absorb odour) to lure a potential suitor. However the problem with this use of anecdotes and speculation is that while it can often be used to illustrate a scientific point, some speculation lacks sufficient scientific support to be convincing. For example, the authors suggest that the reason large breasts are considered attractive by men is that they have been classically conditioned to link breasts with pleasure (p 281-283). This sense of pleasure is supposedly based on the pheromones that a mother releases while breast-feeding, a time when the infant would view breasts as being large (relative to their size at that age). These maternal pheromones would then affect the hormonal conditions in a male brain (though not female) leading to the preferences later in life. While this is an intriguing idea, there is only one study offered in support, which shows that if the mother of a male rat is scented with lemons during the male's infant years, then this preference for a lemon scented females will carry into his adult mating behaviour (Fillion & Blass, 1986). While anecdotes and speculative reasoning are certainly intellectually stimulating, the examples given are sometimes less than convincing. If classical conditioning could be involved in a preference for big breasts, it could also be argued that stimulation would occur in the presence of milk, in feeding situations, or could be generalised to other stimuli; ideas the authors do not consider.

Critical reasoning

This occasional lack of corroborating evidence is compounded by a lack of critical reasoning on the part of the authors. The use of the term *pheromone* is an excellent example. The authors introduce this in the context of Karlson and Lusher's (1959) original definition, which can be loosely reduced to a substance involved in chemical communication between two individual organisms, usually of the same species that produces a specific behaviour or effect on development. However other characteristics of pheromones are highly debated. Does a signal

have to be unconsciously received to be a pheromone? Does it have to produce an innate response? Does there have to be an evolutionary advantage to both the sender and receiver? None of these questions are addressed in the text. Based on these criteria the question of whether humans can actually transmit and receive pheromones is also fiercely debated within the field of olfaction research (Ben-Ari, 1998), yet this debate is also not addressed by the authors. Given the confusion regarding the term pheromone and its questionable application to humans, it would have been more appropriate to either actively defend the concept of human pheromones, or to use a less esoteric term such as *olfactory cue* or *chemical message*.

Homosexuality

One area I found to be particularly engaging was the author's consideration of sexual orientation. In addition to giving some consideration to the biological basis of human homosexuality, reviewing the classic papers by the likes of Le-Vay (1991) and Hamer et al (1993), there is also some discussion of how pheromones may play a role in the origins of same-sex behaviour. The authors draw upon animal studies (Bakker et al, 1996) demonstrating that if a male's ability to distinguish between the sexes, using odour, is disrupted, this leads to the development of "bi-sexual behaviour" later in life (p 291). It is then suggested that this same process could be applied to humans (especially in males), to explain the range of sexual behaviours that we demonstrate. Though this issue is perhaps better explored by Kohl in some of his more academic papers (Kohl, 2002), the basic idea is that higher levels of oestrogens among homosexual males during development could result in an atypical reaction to the olfactory cues of females, which would in turn alter the neural and hormonal processes associated with attraction and reproduction. What would have been more interesting would be to see this idea extended to include a more thorough analysis of how an individual's sexual orientation can af-

fect behaviour associated with body odour. Trevathan (1993), for example, found that the process of menstrual synchronisation among cohabiting women was not observed among lesbian couples, a possible result of the nature of their relationship.

Conclusion

The Scent of Eros is certainly an engaging text that informs the reader about the majority of key studies performed on human olfaction. Where it is let down is a lack of supporting evidence for some of the ideas considered, and a lack of critical consideration for some of the evidence that is presented. A reader unfamiliar with olfaction research could come away from this text unaware of several key debates within the field, and take it for granted that humans *do* possess a functional VNO, and that the term pheromone *can* be applied legitimately in research concerning human olfaction. In short this lack of a critical approach undermines the validity of the book's contents. However it should be remembered that this book is aimed at a general audience, and as a result the authors may have felt it inappropriate to address the debates within olfaction research for such an audience. For a more academic consideration of the field by the authors, I would recommend Kohl's more recent review paper (Kohl et al, 2001), which addresses the issues outlined above.

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References

- Bakker, J., Baum, M. J., & Slob, A. K. (1996) Neonatal inhibition of brain estrogen synthesis alters adult neural *Fos* responses to mating and pheromonal stimulation in the male rat, *Neuroscience*, 74, 251-60.
- Ben-Ari, E.T. (1998) Pheromones: what's in a name?, *Bioscience*, 48, 505-511

- Fillion, T. J. & Blass, E. M. (1986) Infantile experience with suckling odors determines adult sexual behaviour in male rats, *Science*, 231, 729-31
- Garcia-Velasco, J., & Mondragon, M. (1991) The incidence of the vomeronasal organ in 1000 human subjects and its possible clinical significance, *Journal of Steroid Biochemistry and Molecular Biology*, 39, 561-564.
- Hamer, D. H., Hu, S., Magnuson, V. L., Hu, N., & Pattatucci, A. M. L. (1993) A linkage between DNA markers on the X chromosome and male sexual orientation, *Science*, 261, 321-7.
- Jacob, S., & McClintock, M.K. (2000) Psychological state and mood effects of steroidal chemosignals in women and men, *Hormones and behaviour*, 37, 57-78.
- Jacob S., B. Zelano, A. Gungor, D. Abbott, R. Naclerio, and M. K. McClintock. (2000). Location and gross morphology of the nasopalatine duct in human adult. *Archives of Otolaryngology - Head and Neck Surgery*. 126 (6): 741-748
- Johnson A., Josephson R., & Hawke M. (1985): Clinical and histological evidence for the presence of the vomeronasal (Jacobson's) organ in adult humans, *Journal of Otolaryngology*, 14:17-79.
- Karlson, P. & Luscher, M. (1958) Pheromones: a new term for a class of biologically active substances, *Nature*, 183, 55.
- Kirk-Smith, M., Booth, D. A., Carol, D., & Davies, P. (1978) Human social attitudes effected by androstenone, *Research communications in psychology, Psychiatry and behaviour*, 2, 379.
- Kohl, J. (2002) Homosexual orientation in males: human pheromones and neuroscience, *Across Species Comparisons and Psychopathology*, 3, 2, 19-24
- Kohl J. V., Atzmueller M., Fink B., & Grammer, K. (2001) Human pheromones: Integrating neuroendocrinology and ethology, *Neuroendocrinology Letters* 22 (5): 309-321
- LeVay, S. (1991) A difference in hypothalamic

- structure between heterosexual and homosexual men, *Science*, 253, 1034-7
- Maxwell, M. (1984) *Human evolution: A philosophical anthropology*, Croom Helm, London.
- Penn, D. J., & Potts, W. K. (1999) The evolution of mating preferences and major histocompatibility complex genes, *American Naturalist*, Vol 153, Iss 2, 145-164.
- Preti, G., Spielman, A. I., & Wysocki, C.J. (1997) Vomeronasal organ and human chemical communication, *Encyclopedia of Human Biology*, 2nd ed, vol. 8., pp. 769-83.
- Stensaas, L. J., Lavker, R.M., Monti-Bloch, L., Grosser, B. I., & Berliner, D. L. (1991) Ultrastructure of the human vomeronasal organ, *Journal of Steroid Biochemistry and Molecular Biology*, 39, 4B, 553-60.
- Stoddart, D. M. (1990) *The scented ape: The biology and culture of human odour*, Cambridge University Press, Cambridge.
- Trevathan, W. R., Burleson, M. H., & Gregory, W. L. (1993) No evidence for menstrual synchrony in lesbian couples, *Psychoneuroendocrinology*, 18, 425-35.
- Wedekind, C., & Furi, S. (1997) Body odour preferences in men and women: do they aim for specific MHC combinations or simply heterozygosity?, *Proceedings of the Royal Society of London B Biological sciences*, 264, 1471-79.
- Won, J., Mair, E. A., Bolger, N. E., & Conran, R.M. (2000) The vomeronasal organ: an objective anatomic analysis of its prevalence, *Ear, Nose & Throat Journal*, 79, 8.
- Wyatt, T.D. (2003) *Pheromones and animal behaviour: Communication by smell and taste*, Cambridge University Press, Cambridge.