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Book Review

All Thorns, No Rose: A Well-Intentioned but Misguided Book about Smell

A review of Rachel Herz, *The Scent of Desire: Discovering Our Enigmatic Sense of Smell*. William Morrow: New York, 2007, 288pp, US$24.95, ISBN-12 978-0060825379 (hardcover)

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With her first book, Rachel Herz aims to inform readers about their sense of smell, encouraging them to both engage and appreciate this oft-neglected sense. *The Scent of Desire* fills a literary gap as the first popular science book to examine the psychology of smell. However, as a scientifically informed guide to olfaction, this book falls short.

The introductory chapters provide an introduction to the subject of olfaction. The first chapter is devoted to the anatomy of the olfaction system and reviews competing theories about how smells are recognized and characterized by the brain. It is full of anecdotes highlighting the role smell plays in our daily lives, providing the naïve reader with a straightforward entry into the world of olfaction. Herz also mentions in passing that other mammals that do not share our trichromatic vision rely more on their sense of smell than we do, acknowledging the likely trade-off between vision and olfaction in humans. Later, Herz speculates that humans' smell preferences develop through odor-associative learning. She discusses how the association of novel smells with positive and negative experiences might produce the individual and cultural differences in smell preferences that she outlines. Herz also tackles memory, drawing an important distinction between the objective accuracy and the emotional quality of memories, allowing her to appropriately distinguish between accurate memories and impactful memories. She continues to use anecdotes to discuss both recovered memories and the links between smells and post-traumatic stress disorder.

The middle chapters draw connections between olfaction and several other disciplines or areas of popular interest. Herz introduces the reader to aromatherapy and the perfume industry, beginning with brief reviews of their histories. She also includes a section about multiple chemical sensitivities syndrome, which provides the reader with a

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deeper appreciation for the complexities of the psychology of olfaction. Two of these middle chapters address topics that are likely to be of greatest interest to evolutionary psychologists—the role of scent in sexual attraction and parenting. Although the penultimate chapter feels at times as if it belongs in a book about taste rather than smell, Herz does manage to present a few interesting links between taste and smell.

The final chapter reviews the applications of olfaction research to technology and suggests future directions for olfaction research and technology. Herz first turns to electronic noses, or "e-noses," which are capable of distinguishing patterns of previously programmed chemical odors. E-noses already have been successfully put to use in the food industry, quickly and accurately identifying spoiled food items such as meats. E-noses are an improvement on traditional spoilage sensors because they produce immediate results and are capable of detecting the presence of more than one chemical at a time. Herz also suggests ways in which smell research can be applied to the fields of medicine, warfare, and ecology.

As an introduction to a section about the importance of smell for omnivores, Herz asks a series of misguided questions regarding associative learning which belie a naïve adherence to species selectionist theory. She frames the section by asking, "In other words, is it good for the survival of the species?" (p. 49). This question exposes Herz's misunderstandings about evolutionary theory while simultaneously presenting the uninformed reader with the impression that species selectionist theory is widely accepted. *The Scent of Desire* contains many more references to behaviors that purportedly evolved and are performed for the good of the species. Herz thereby perpetuates confusion about evolution, despite acknowledging Richard Dawkins (who dealt devastating blows to group selection in his 1976 classic, *The Selfish Gene)* as a scholar who influenced her work [Of course, the initial critique was presented by Williams (1966)].

Herz also perpetuates confusion about the nature of learning and its machinery. She presents a false dichotomy between "learned" and "evolved" traits by querying, "But why would it be that our responses to odors are learned and not innate?" (p. 49). This question implies that there is a difference between behaviors that are learned and those that are "innate," a perpetuation of the irrelevant nature versus nurture debate. Learning requires innate machinery that could only have evolved through natural selection (see Tooby and Cosmides, 1992). Herz would have been better served by asking, "But why would it be that our responses to odors vary across individuals?" This more accurately addresses the issue that she later describes—namely, that adults do not have uniform disgusts or preferences for specific odors—and dovetails into the aforementioned discussion of odor-associative learning.

Unfortunately, such confusion about learned versus evolved traits is not an isolated incident. Later, Herz suggests that one of the distinguishing features of the sense of taste is that our preferences for tastes are "primarily hardwired and innate, rather than learned" (p. 186). This comment mistakenly implies that all behaviors or preferences not reliably present at birth cannot have evolved through natural selection.

Herz also mistakenly separates the brain from the mind and, correspondingly, biology from psychology. For example, when discussing mate preferences, she separates the workings of the brain from those of the mind: "Is some ancient part of our brain

subconsciously pointing us toward genetically compatible mates? Or is there something more psychological about why women prefer men whose body odor signifies a compatible genetic match? While these questions cannot yet be fully explained, there is evidence that both biology and psychology play a role" (p. 130). These questions imply that the evolved mechanisms of the brain are somehow separate from psychology. Where does a person's psychology come from if not from a history of natural selection? The distinction that Herz presents between biology and psychology incorrectly suggests to the naïve reader a dualism of the human mind and body. Later, Herz concludes that the preference for mice to mate with dissimilar others is "based on experience—psychology not biology" (p. 131). Once again, Herz fails to acknowledge that psychological mechanisms, not just anatomical or biological features, have evolved through natural selection.

Herz continually presents a muddled understanding of adaptations. For example, she seeks to convince the reader that "uneasiness in the face of uncertainty is adaptive" (p. 53). According to Herz, a predisposition to be cautious of novel situations, or smells, is currently adaptive. Although it may be reasonable for her to suggest that this uneasiness might have been adaptive for our ancestors, speculation that these behaviors are currently adaptive is misguided. It is not possible to predict which current traits will provide future success for our distant descendents. Then, of course, there is the problem of properly defining what is "adaptive" (see Tooby and Cosmides, 1992; and also Dawkins, 1982).

Herz continues to confuse the nature of adaptations when she attempts to account for those people, specifically some chefs and perfumers, who claim to be able to conjure mental representations or images of smells. Herz suggests that individual differences in smell imagery ability are due to the fact that "selection processes are variable" (p. 88). This suggestion is not only unaccompanied by relevant citations but also is confusing. Is Herz suggesting that the ancestors of modern day chefs and perfumers were subject to different selection pressures than the rest of our ancestors? This section is bound to leave the reader lost, although it is housed between sections which are well-written and informative.

In some instances, Herz manages to provide insufficient or garbled evidence as well as misunderstanding about adaptations. In the section about parenting, Herz refers to a study in which it was shown that women could identify their infants by smell after two days. Herz continues, "It is clearly adaptive for mothers to quickly learn who their infants are since, in case of threat, the mother is a lot more capable of finding and rescuing her baby than a newborn is of finding its mother" (p. 157). This argument lacks clarity. For rapid maternal recognition to have evolved, lost newborns must have been a recurrent problem over our evolutionary history. Given that there is no clear evidence of ancestral newborns being consistently misplaced or left behind, an alternative speculation would have been better suited to her purpose: Consistent with the material presented in the rest of the chapter, perhaps kin recognition systems which utilize MHC similarity underlie successful identification of both adults and children to whom an individual is genetically related.

The book includes numerous instances in which the evidential reasoning is simply insufficient. For example, Herz alleges that following a learned association, smells can evoke emotional and physical states. She argues that the manipulation of these states through the use of aromatherapy can cause changes in mood as well as in behavior.

Although this is an interesting speculation, and certainly one that the aromatherapy industry would like to broadcast, Herz's claim is not empirically supported. She does not cite or even make informal reference to empirical work documenting a therapeutic value for aromatherapy.

As yet another example, during the lead up to her discussion of body chemistry, Herz reports that she "reasoned that although having a man around who is a good provider will increase the likelihood that a child will thrive and be a parent one day her- or himself, it could not be nearly as important as whether or not the child is healthy in the first place" (p. 124). This hypothesis was tested and falsified two decades ago. Women prioritize resources above health when considering potential mates (Buss, 1989).

The section relating smell to taste contains numerous errors in logic. After arguing that bitter foods can be poisonous or healthy, Herz speculates that, "it would be most adaptive for us to be wary but not entirely repelled by bitter substances" (p. 187). This is a potentially interesting speculation, but one that lacks both evidence and logical clarity. What is the adaptive problem that incomplete wariness of bitter foods might have solved? Why should we assume that the benefits of eating the healthy, bitter foods cannot be garnered from another source? Readers would be better served by skipping this unfortunate paragraph and proceeding directly to the author's discussion of "supertasters."

According to Herz, supertasters are people who experience taste more acutely due to an increased number of taste buds. Because supertasters have more sensitive taste, they supposedly eat fewer healthy, but bitter-tasting, vegetables. Without citing empirical work to support her claim, Herz also suggests that reduced vegetable intake is a risk factor for cancer. Citing two studies that correlate supertaster status with types of cancers, Herz concludes that, "supertaster physiology can induce behaviors that are potentially dangerous" (p. 188). With this statement, Herz goes—once again—far beyond the evidence she presents. She infers causality where no such claim should be made, given that the correlational links between supertaster status, vegetable consumption, and cancer are small, at best.

The Scent of Desire would have been improved had Herz drawn upon the work of a few specific scholars. After suggesting that humans are generalists rather than specialists with regard to food consumption, Herz argues that humans benefit from identifying suitable items for consumption through the use of smell. Although her argument is reasonable, it may have been strengthened had she drawn upon research and theory presented in Michael Pollan's (2006) *The Omnivore's Dilemma: A Natural History of Four Meals*. Pollan provides a more detailed review of food preferences, acknowledging the diverse influences of food recognition, memory, and cultural traditions.

Despite being an academic herself, Herz's book contains a scarcity of scholarly citations. This oversight leaves the reader without the appropriate resources to determine if there are empirical bases for her assertions. For example, Herz describes two large surveys that her lab conducted (pp. 132-133) as well as the conclusions she drew from them without reference to any published, peer-reviewed articles. Later, she states that "Dr. Cynthia Graham, while working at the Kinsey Institute, found that a popular cologne for men was able to enhance women's fantasies and intensify their sexual arousal" (p. 133). Although Herz includes a footnote about the mission of the Kinsey Institute, she does not cite the

published journal article (see Graham, Janssen, and Sanders, 2000). The dearth of citations throughout this section, as well as the entire book, is frustrating and disappointing.

The book is approachable at the expense of being overly simplistic. For example, Herz declares that "Our immune systems are coded for by a cluster of genes called the *major histocompatibility complex*, or *MHC*" (p. 125, emphasis in original). This statement, presumably intended to be basic enough for a naïve audience, winds up being both simple and false. As one of the papers Herz cites describes, the major histocompatibility complex is a polymorphic region of DNA whose protein products assist the immune system in distinguishing self from non-self (Penn and Potts, 1999, cited in Milinski and Wedekind, 2001). The MHC, formally labeled the human leukocyte antigen in humans, codes for only a *portion* of immune system function, rather than its entirety, as Herz mistakenly claims.

Herz continues to oversimplify when discussing the research linking female preferences for male odor with MHC. She presents a brief review of relevant literature to support the conclusion that women prefer the smell of men whose MHC-associated odor is dissimilar from their own. This is a gross oversimplification of the rich empirical and theoretical work on MHC-associated odors, which includes a sizeable literature indicating that women actually prefer the smell of men whose MHC-associated odor is optimally dissimilar, rather than absolutely dissimilar, from their own (Jacob, McClintock, Zelano, and Ober, 2002; Penn and Potts, 1999).

In summary, potential readers will encounter misrepresentations of evolutionary theory, unsupported claims, lack of appropriate citations, and gross oversimplification throughout *The Scent of Desire*. Although this book does provide an interesting introduction to human olfaction, we recommend that curious readers either explore the rich scholarly literature on olfaction or hold out for a popular science book that is less intellectually frustrating and disappointing.

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