

## Evolutionary Psychology

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### Book Review

#### The Human and Non-Human Life of Insects

A review of Marlene Zuk, *Sex on Six Legs: Lessons on Life, Love, and Language from the Insect World*. Houghton Mifflin Harcourt: New York, 2011, 272 pp., US\$25.00, ISBN-13 #978-0151013739 (hardcover).

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Marlene Zuk, a professor of biology at the University of Minnesota, compiles research on insect behavior in her book, *Sex on Six Legs: Lessons on Life, Love, and Language from the Insect World*, which exposes the reader to the wide diversity of behaviors that insects exhibit. Her aim is to convince the reader that entomological behavior is worthy of investigation, not only because the endeavor is intrinsically fascinating, but also because the comprehension of insect behavior elucidates the understanding of human behavior. She pursues the latter goal by theming the book in such a way that many of the insect characteristics conveyed run parallel with human features, while persistently reminding us that these resemblances may only be superficial.

The book appears to be targeted for the general public, as indicated by the lighthearted language of the book, the abundance of personal anecdotes and popular cultural references, and the choice of showcasing some of entomology's sexiest experiments. A number of the studies discussed in the book are prefaced with a colorful background of the researcher and a vivid detailing of the research setting, providing the reader with a more lucid experience of the study. For example, Zuk provides an overview of how Gene Robinson, an entomologist at the University of Illinois, became fascinated with insects. Robinson's childhood included time harvesting grapefruit, which he found so boring that he volunteered to work with bees at an Israeli kibbutz (p. 44). Zuk also recounts her experiences at the University of Michigan, where she worked in the same building as evolutionary biologist David Sloan Wilson. When Wilson would conduct his research on burying beetles, the accompanying stench of the beetles "was enough to make paint peel" (p. 161). In addition to its appeal to pathos, the multitude of personal anecdotes and popular cultural references serve as a starting point to dispel misconceptions about insects that the general public may have. At times, however, the content requires that the reader has a

general understanding of the mechanics involved in evolution, particularly in the chapters in which she discusses genomics and sex ratios.

Zuk argues that the individuality of insects is underappreciated and that many insects possess mechanisms for individual recognition as well as individual “personalities” (or, more technically, behavioral syndromes that describe repeatable clusters of traits). She evidences the claim of individual recognition and personality types with reference to research on paper wasp hierarchies and “shy versus bold” sunfish, respectively (Tibbetts, 2002; Tibbetts and Dale, 2004; Wilson, Clark, Coleman, and Dearstyne, 1994). Zuk is careful to avoid any slippery slope conclusions that these behavioral syndromes are personalities in the sense used by personality psychologists studying humans. Personality in humans often entails a certain quality of emotion; for example, if a person initiates a fight with another individual in a status contest, feelings of anger may be a proximate explanation for the aggressor’s attack, and it is the aggressor’s “disagreeableness” trait that might facilitate this process. However, to say that paper wasps attack each other during the negotiation of a status hierarchy because they are “angry” is an overreaching comparison to humans. Zuk reminds readers throughout her book that insect physiology is different in many important ways from the human endocrine system, with the result that insect resemblance to human personality traits is likely to be superficial. However, despite the differences in the underlying mechanics, the end result produces the individual uniqueness in insects that people usually attribute only to humans and other vertebrate species.

Another misconception about insects that Zuk attempts to dispel is that insects are not capable of learning and teaching. Her argument that insects can learn from their environment is empirically well-supported. Zuk cites a study of ants that are able to free their nest mates from nylon filament restraints (which are novel stimuli to ants) thereby exhibiting a capacity for flexible learning (Nowbahari, Scohier, Durand, and Hollis, 2009). The relationship between insect and human teaching is a more difficult comparison to make, which Zuk recognizes when she writes that “we should not redefine teaching so that only humans can be said to do it” (p. 34). Animal psychologists define teaching in a specific way, requiring that an animal is regarded as teaching only if feedback from the naïve observer alters the teacher’s guidance, a criterion known as “evaluation.” Zuk cites tandem running in ants as a form of teaching because the teaching ant waits for the follower ant to catch up before the leader continues its path (Richardson, Sieeman, McNamara, Houston, and Franks, 2007). Given that some ant species employ graded recruitment in their hunting group sizes in response to a target prey’s weight and size (Schatz, Lachaud, and Beugnon, 1997), it would be interesting to see if tandem learning is affected by this factor, and how “patient” a teacher ant will be in waiting for the follower ant when the size and weight of the food source is manipulated. Or, given that some spiders and ants mutually predate one another (Halaj, Ross, and Moldenke, 1997), it would be worth investigating whether the selection pressure to approach a given food source in larger groups via tandem running would be affected by the potential predation danger present in the food source.

Zuk also provides insightful discussions of sperm competition and cryptic female choice in insects. Insects are among the most researched classes of animals in the literature addressing sperm competition and cryptic female choice. Zuk showcases the many merits

of studying these topics in insects. For example, she mentions that the relative brevity of insect life cycles permits fast turnaround times for breeding experiments, and the high level of female promiscuity among many insects generates intense levels of sperm competition.

Missing from the chapter on sperm competition is even a brief discussion of research on human sperm competition. Zuk draws parallels between insect and human features throughout the book. Although there are other features of insects she discusses but does not relate to humans, these features are commonly known to be exhibited by humans, including parental investment, learning and teaching, individual differences in personality, and communication. Relative to the other topics covered, human sperm competition is a newer area of research, and one that is not widely appreciated among the general public (the book's target audience). Its inclusion might have provided an enriching context in which to further appreciate the similarities and differences between insects and humans.

Zuk's goal of emphasizing that apparently similar behaviors in humans and insects typically represent superficial similarities is best conveyed in her discussion on same-sex courtship in insects. She reviews research showing how same-sex members of a species mate with each other in response to a set of unique, species-specific selection pressures which cannot be extrapolated to homosexuality in humans. Blue-tailed damselflies live a brief life, and must be judicious in how they spend their time (Van Gossum, De Bruyn, and Stocks, 2005). Courtship and mating consumes a considerable amount of a female damselfly's time, and to deter unwanted suitors, some females present as a male of their species. Because missing a mating opportunity is more costly to males than expending the time courting and mating, males have evolved to be less discriminating about the target of their sexual attention. This cognitive bias has led to the occasional male-male mating. Zuk convincingly argues that the scenario of a female being deceptive about her sex and a male's overperception to "play it safe" cannot be extended to human homosexuality because the features in this scenario are uncharacteristic of human sexual conflict: human females do not commonly try to appear as men as a tactic to avoid being approached by suitors, and human males do not commonly court other men "just in case" a man might be a woman. In line with the theme of the book, resemblance in behaviors between humans and insects is superficial, and the evolutionary mechanisms which led to these similarly-appearing behaviors are different.

A key aim of *Sex on Six Legs* is to communicate to the reader that insects are interesting, and worth studying. Zuk does a fine job maintaining precision in the concepts and terminology, as well as providing the necessary qualifiers when drawing parallels between insects and humans. Ultimately, the language, combined with the abundance of personal and cultural anecdotes, makes this book ideal for members of the general public with an interest in gaining an entertaining but accurate introduction to insect behavior.

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