Book Reviews

Curious Behavior: Yawning, Laughing, Hiccupping and Beyond. By Robert R. Provine. x + 271 pp. Cambridge, MA: Belknap Press (Harvard University Press). 2012. $24.95 (cloth).

Every day we yawn, sneeze, scratch, etc. Although these behaviors are clinical signs, of interest to the physician for diagnosis, few researchers have chosen to focus on their causes and mechanisms. Robert R. Provine is one of the rare researchers who has. His invigorating book takes a popular science approach accessible to anyone with a curious mind. Provine is well known as a neuroscientist, Professor of Psychology at the University of Maryland (Baltimore, USA). He studied under Rita Levi-Montalcini (winner of the Nobel Prize in Physiology or Medicine in 1986), initially focusing on the development and evolution of the nervous system, notably in chick embryo. Influenced by these early studies, his thirteenth and ultimate chapter can be interpreted as a prophetic professional testament. In that, Provine offers convincing arguments to redress the long neglect of prenatal behavior, "to establish an embryocentric perspective, a framework of thinking about early development, and to provide a sample of some of the extraordinary phenomena of prenatal life" (p. 202).

Provine brings together ethology, neurophysiology as well as psychology to describe the secrets of our daily behaviors in detail. He also covers their ontogenesis and phylogenesis. However, the behaviors he has personally studied—yawning, laughter, tickling, and crying—stand out distinctly in chapters that are the book's best and most complete. The chapters on vomiting, coughing, belching, and farting are merely compilations of data assembled with humor, but without originality. This is undoubtedly due to the more medical nature of these topics. Blinking is not included in the book, unfortunately.

Provine pioneered the study of yawning in the early 1980s, scientifically proving the absence of any increased brain oxygenation, a role associated with yawning for two centuries. His work highlighted the involuntary nature of yawning, its daily frequency and its rhythms. In his book, he identifies universal yawning common to all vertebrates, which he links to emotion in a number of organisms, but focuses particularly on the contagiousness of yawning in humans. He describes the simple experiments he has conducted to identify facial and auditory expressions necessary for yawning transmission, while also commenting on contemporary research in functional neuroimaging, which points to the similarity between this behavioral coordination between two individuals, and the mechanisms of empathy. The enigma of yawning's function remains to be elucidated, but Provine concludes with his own hypothesis, appealing in its simplicity: "Yawning is a response to and facilitator of change in behavioral and physiological state" (p. 37).

Continuing and comparing with another contagious behavior, Provine breaks down laughter into its involuntary ha-ha vocalizations. Laughter is associated with humor, but may arise in many tragic situations. Provine gives the example of the rat's laughter and its apparent lack of humor! He develops his ideas by differentiating human laughter from primate laughter, attributing the differences to bipedalism, which enables humans to dissociate respiratory frequency from movement. Provine explains why other primates are unable to speak based on the physiological differences in laughter mechanisms. Once again revealing falsehood in commonly held beliefs, Provine notes that "the idea that laughter is good for us has become so pervasive that we neglect the fact that laughter, like speech and vocal crying, is a vocalization that evolved to shape the behavior of other people. Laughter no more evolved to make us feel good or improve our health than walking evolved to promote cardiovascular fitness" (p. 63).

Is there anything more disagreeable than the sound of crying? As Provine reminds us, crying is the newborn's only means of expression (even premature babies cry) and is thus phylogenetically primitive, with a contagiousness that is, here again, relationally significant. Crying is very frequent before the acquisition of language. Provine invites readers to remember the last time they cried and whether the crying was accompanied by pain or fear. Bringing in sociology, Provine evokes all the disastrous social consequences that inappropriate crying, like inappropriate laughter, can have. Incidentally, such behavior is often a sign of neurological pathology.

Those who suffer from dry eye know how painful this condition can be. All animals produce a tear film, essential for the cornea's trophicity. However, of all the behaviors studied, crying with tears of emotion is a strictly human phenomenon. Tears accentuate the perception of sadness by those observing the person crying. The drawings in the book show this very clearly, going so far as to indicate that tears flowing into the forehead would not trigger any perception of sadness.

Provine includes a short chapter on the significance of non-verbal communication associated with the whites of the eyes, a characteristic limited to humans. A sign of good health, eye whiteness is also linked to sexual attractiveness and helps in decoding intentionality by the orientation it gives the gaze. It also communicates information on emotional state, with relation to theory of mind.

By studying the various auditory and chronological components of sneezing, Provine offers an original parallel with yawning—"the sneeze as a fast yawn"—but points out its puzzling non-contagiousness. He offers a new explanation for the curious case of the photic sneeze, associating it with the circadian rhythms of yawning and likening it to a "*zeitgeber*."

Hiccupping, an involuntary behavior for which Provine explains the physiological mechanisms, is more frequent in the fetus than after birth, as yawning is, which indicates its important role in wiring the neuronal circuits that regulate the diaphragm, before the respiratory system is fully functional. Hiccupping has several common points with yawning; both may be symptomatic of pathologies involving brain tumors or hysteria.

It may seem trivial to cover tickling. Provine nonetheless reveals its subtle neurophysiology, its social role from the mother–child relationship to the first sexual encounters and its ambivalence in terms of pleasure–displeasure, which it shares with itching. Provine gives us a glimpse of the research that remains to be done on tickling, to enhance our knowledge of the underlying neuropsychological mechanisms that enable us to distinguish the self from others.

Just reading the chapter on scratching makes the most suggestive of these behaviors into an irresistible itch.

Provine offers a perfectly coherent explanation of the neurobiological mechanisms and how they serve to elucidate the physiology of sensitivity and pain. As an extremely common symptom submitted to the physician's diagnostic wisdom by embarrassed patients, scratching may indicate a wide range of diseases, from jaundice, parasitosis, and allergies to psychopathologies.

Aimed at a wide readership, Provine's book consists of 13 chapters written with humor: "The behavioral approach of B. F. Skinner, which focuses on what people do instead of what they claim as their motives, proves useful for studying unconsciously controlled human behavior, a Freudian theme. Marx was also an influence—Groucho, not Karl" (p. 7). Provine argues that the "small science" or "sidewalk neuroscience" he practices has real value; using only minimal resources, available to anyone, he is studying behaviors that raise serious questions.

OLIVIER WALUSINSKI
Private Family Physician
Brou, France

DOI: 10.1002/ajhb.22364
Published online in Wiley Online Library (wileyonlinelibrary.com).