Revenge may be frowned upon, [...] but the urge to extract a pound of flesh, researchers find, is primed in the genes.

Acts of personal vengeance reflect a biologically rooted sense of justice, they say, that functions in the brain something like appetite. Alternately voracious and manageable, it can inspire socially beneficial acts of retaliation and punishment as well as damaging ones.

"The best way to understand revenge is not as some disease or moral failing or crime but as a deeply human and sometimes very functional behavior," said Dr. Michael McCullough, a psychologist at the University of Miami. "Revenge can be a very good deterrent to bad behavior, and bring feelings of completeness and fulfillment."

Retaliatory acts, anthropologists have long argued, help keep people in line where formal laws or enforcement do not exist. Before Clint Eastwood and Arnold Schwarzenegger, there was Alexander Hamilton, whose fatal duel with Aaron Burr was commemorated this month on the banks of the Hudson River. Recent research has shown that stable communities depend on people who have "an intrinsic taste for punishing others who violate a community's norms," said Dr. Joseph Henrich, an anthropologist at Emory University in Atlanta.

Using brainwave technology, Dr. Eddie Harmon-Jones, a neuroscientist at the University of Wisconsin, has found that when people are insulted, they show a burst of activity in the left prefrontal cortex, a part of the brain that is also active when people prepare to satisfy hunger and some cravings. This increased activity, Dr. Harmon-Jones said, seems to reflect not the sensation of being angry so much as the preparation to express it, the readiness to hit back.

Savoring the taste can be satisfying enough. When Kurt Raedle, 40, a salesman in Kansas City, Mo., had a new leather jacket stolen from a party, he fantasized about getting his hands on the thief. A month later, a friend spotted the rascal wearing the jacket at a bar and helped Mr. Raedle track him down. Mr. Raedle said he telephoned him. "He was guilty, and he wanted to mail the jacket to me, but I said no. I wanted him to return it, in person, to my parents' house. I wanted him to face the parents of someone he'd stolen from."

The penalty: a half-hour discourse on morals and life lessons from Mr. Raedle's father, all 6 feet 4 inches and 250 pounds of him.

This kind of payback is closer to what sociologists and philosophers call just deserts retribution. Dr. John M. Darley, a professor of psychology and public affairs at Princeton University, said
such actions involve a deliberate effort to tailor the retribution to the crime, often taking into consideration as many relevant details about the offender and the offense as possible.

Yet the nature of appetite-like urges, scientists say, is to err on the side of excess. Although soup and salad might suffice, hungry people dream of the dinner buffet. Likewise, those who feel wronged very often overdo it, engaging in extravagant, almost sensual fantasies of payback of wrecking a household, snuffing a career, dancing on a grave.

[...]

Researchers have found a number of ways people can peaceably satiate their hunger for revenge: Work to feel empathy for the other person. Savor what advantages you do have. Pledge to behave even if the urge for vengeance lingers to behave, if not to forgive. Think for a while about the nasty things you have done.

But there is another option, said John Sawyer, 44, a Denver businessman who lived daily with an urge to exact revenge after being shot one February night in 1987 during a botched robbery attempt.

It took Mr. Sawyer six months to recover physically from the gunshot wound, and about a year before he stopped being angry at the three men who hurt him.

"I felt that forgiving them was its own kind of revenge," he said. "It showed they hadn't defeated me; it was like I had risen above what happened, and above them."