Empirical Science for the Spotless Mind

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The blank slate, the dominant theory of human nature in modern intellectual life stating that humans are shaped entirely by their experiences and not by any preexisting biological mechanisms, is being challenged and soundly trounced by the cognitive, neural, and genetic sciences, said Steven Pinker, Harvard University, in his Keynote Address.

"Everyone has a theory of human nature," Pinker said. "Everyone has to anticipate the behavior of others, and that means all of us have theories, tacit or explicit, about what makes people tick."

For hundreds of years, three such theories — the blank slate, the noble savage, and the ghost in the machine — have provided the foundation for moral values and social conduct. Each of the theories, while flawed, is not without its appeal.

John Locke's tabula rasa, or blank slate, compares the mind to white paper inscribed gradually by experience. Such a proposal is attractive to egalitarian spirits, as it undermines aristocratic claims of innate, superior wisdom. Jean Jacques Rousseau's account of the noble savage holds that "nothing could be more gentle than [man] in his primitive state," providing philosophical hope for a utopian society in which armed governments and police forces are unnecessary. Rene Descartes' belief in the division of soul and body — the ghost and the machine — is welcomed by optimists seeking transcendent pursuits of love, worship, beauty, and knowledge, as well as a soul that can survive the death of the body.

What unsettles Pinker isn't that these theories hold sway but that they are accepted unconditionally despite increasing evidence against them. "There's something deeply wrong with all of this," he said, "beginning with the blank slate."

Challenges to the Blank Slate

As Pinker argued, this trilogy of theories becomes undone, repeatedly and irreparably, under the lenses of modern science — particularly, cognitive understanding, evolutionary psychology, and neurology. "There have to be some innate mechanisms to do the learning, to achieve the socializing, to create and transmit the culture" upon which experiences are based, Pinker said.

From a cognitive perspective, such mechanisms include a number sense; a sense of spatial representation; the ability to grasp the thoughts of others; a language instinct; and decision rules that govern behavior. Other human drives can only be understood within the context of evolution. For example, our desire for sugar and fat, resources whose scarcity once made their rapid consumption vital, has not diminished, though we can now reproduce them at large.

Perhaps the most devastating argument against the blank slate comes from neuroscience, where research by APS William James Fellow Award winner Robert Plomin and others has shown that identical twins separated at birth share many astonishing similarities despite vastly different upbringings. Take the remarkable case of this pair: one twin raised as a Catholic in Nazi Germany, the other by his Jewish father in Trinidad. When they were reunited in their 40s at a Minnesota lab, both of them were wearing identical navy blue shirts with epaulets; rubber bands around their wrists; flushed the toilet before using it as well as after; and intentionally sneezed in crowded elevators to watch other people jump.

The noble savage theory has been subjected to equally rigorous attacks from the brain and behavioral sciences, Pinker said. Neuroscience has identified brain mechanisms associated with aggression, and the resulting data conflicts with Rousseau's theory; as ignoble as Western civilization may seem at times, it remains leaps and bounds ahead of savage existence. A study documenting warfare in various societies showed that in pre-state, or relatively uncivilized, areas such as the New Guinea highlands and the Amazon rainforest, the percentage of male deaths due to warfare ranged from around 10 to 60 percent. The same statistic for the United States and Europe combined during the 20th century, including both World Wars, was infinitesimal by comparison.

In opposition to the ghost and the machine theory, cognitive science has shown that intelligence can be explained in mechanistic terms, Pinker said. Machines that display artificial intelligence can be built, such as Deep Blue, which defeated world chess champion Garry Kasparov in 1997. Surgery can demonstrably alter the functioning of the brain, most famously in APS President Michael Gazzaniga's studies of split brain patients, in which the corpus callosum is severed, "leaving two, largely autonomous consciousnesses co-residing in the same skull," Pinker said, "as if the soul could be bisected with a knife."

To Pinker, such findings hoist the blank canvas onto a finely engineered easel, creating a much more comprehensive view of human nature. "The challenges [to the blank slate] are seen to threaten sacred moral values, but in fact that doesn't follow," he said. "On the contrary, a better understanding of what makes us tick can clarify those values." But to others, the idea that thoughts, feelings, and experiences consist of physiological activity in the tissues of the brain leaves a much emptier picture.

Fearing the Science

Despite the abundance of scientific evidence, "there's a widespread fear and loathing of the sciences of human nature," Pinker argued. "Many people are sorry to lose God when they hear of these findings, or at least sorry to lose the values traditionally associated with God." Like the character in "The Truman Show," who believed his world was the beautiful, harmonious product of chance only to find it was a systematically organized series of set-ups, certain irrational fears drive a resistance to scientific discoveries of human nature.

Scientific fear and loathing can result in profound misunderstanding, as exemplified by House of Representatives majority leader Tom DeLay's remarks after Columbine. "Such outbursts of violence are inevitable," DeLay said, "because our school systems teach children that they are nothing but glorified apes evolutionized out of some primordial soup of mud."

DeLay's conclusion is a non-sequitur that arises, said Pinker, because the scientific ideas of human nature "are so unfamiliar in our larger, cultural framework." Pinker, who has done his part to mend this social rift with numerous books on the subject aimed at a general audience — two of which were finalists for the Pulitzer Prize — boiled scientific fear and loathing into four concerns: the fears of inequality,

imperfectability, determinism, and nihilism.

The fear of inequality contends that if the mind possesses innate organization, then people could be biologically different, and that would condone discrimination and oppression. "This confuses the idea of fairness with idea of sameness," Pinker said. "Political equality does not require sameness but policies that treat people as individuals with rights."

A common fear of imperfectability is that if ignoble traits like violence, prejudice, and selfishness are inherent, attempts at social reform and human improvement would be futile. But even if we do house ignoble motives, argued Pinker, "they do not automatically lead to ignoble behavior, precisely because the human mind is a complex system of many parts, and some parts" — a moral sense, and the ability to learn lessons of history, for example — "can counteract others."

The fear of determinism cautions that if behavior is caused by a person's biology, he cannot be held responsible for his actions, exemplified in a Wall Street Journal headline that read: "Man's genes made him kill, his lawyers claim." However, the belief that certain people are born to commit crimes and cannot be stopped is misguided, since behavioral deterrents such as jail time can appeal "to parts of the brain that anticipate the consequences of behavior and can inhibit it accordingly," Pinker said.

As for the fear of nihilism, the fear that "biology strips life of meaning and purpose — that love, beauty, and morality are just figments of a brain pursuing selfish evolutionary strategies," Pinker admitted a sticky existential dilemma. After all, to pass on our genes is not always a satisfying answer to the question: Why am I here? Frequently, Pinker argued, people who are afraid that evolution implies nihilism are confusing two different timescales: human time, or what is meaningful to us now, and evolutionary time, or how we came to have these thoughts in the first place, as the result of millions of years of evolution.

Interestingly, Pinker's presentation betrayed an unannounced, almost atavistic proclivity toward tabula rasa. Each of his slides began as a white background upon which variegated text — often the borrowed words of philosophers, statesmen, and political satirists — was placed. "Meaning in life does not require that the processes that shape the brain have a purpose," Pinker said, "only that the brain itself have a purpose." As his slides withdrew into their original states — colorless, vacant, receptive — it could be said that having meaning in a presentation does not require that its arguments end all discussion, only that the arguments themselves leave a mark. Pinker's Keynote Address at the APS annual meeting did that and more, and in the process set the tone for two days of the most interesting and lively discussions about the science of human nature.