

Sources of temperament: Bashful at birth?

Medieval and Renaissance physicians understood human temperament to be determined by the flow of bodily humors, a notion that was debunked by Enlightenment scientists and replaced in modern times by the contrary assumption that early experience has enduring effects on later personality and behavior. Especially in the wake of Freudian and behavioral theory, scientists have been preoccupied with examining the residue of childhood stress and trauma in adult life. Evidence from two research projects now suggests, however, that childhood temperament — specifically timidity — may indeed be rooted in biology — if not in black bile and phlegm — and that the consequences of early experience may vary depending on a child's temperamental legacy.

The two unrelated studies, both reported at the January meeting of the AAAS, raise the possibility that an early tendency toward timidity or bashfulness may not only persist into later life but may also affect such adult behaviors as career choice and childrearing style. One, an infant study conducted by Harvard University psychologist Jerome Kagan, suggests that extreme shyness in children may be in-born and enduring in its effects; the other, a study of Rhesus monkeys by University of Wisconsin psychologist Stephen J. Suomi, has identified a group of babies, apparently "uptight" from birth, who seem socially less adept than their calmer peers.

According to Kagan, 10 to 15 percent of American children may be abnormally timid or "inhibited" in unfamiliar or unexpected encounters, and, of these, approximately one-third seem to be born with a biological leaning toward such shyness. Kagan observed 100 21-month-old children during encounters with various unfamiliar events, such as meetings with strangers, encounters with robots, or separation from the mother. Based on these initial observations, the 28 "most inhibited" and 30 "least inhibited" children

were identified and retested one month later in the laboratory and again ten months later at home. The most bashful children tended throughout to cling to their mothers and to avoid interaction, both with unfamiliar adults and — especially — with more outgoing peers.

The biological tendency toward extreme bashfulness, Kagan suggests, may be linked to a cognitive inclination in these children to be excessively wary of their world. The most timid children tend to have higher and more stable heartbeats when confronted with foreign events, and because heart rate is influenced by psychological arousal of the sympathetic nervous system, it is possible, according to Kagan, that very bashful children feel compelled to understand everything that is going on around them. Their heartbeats rise because they are doing more mental work in response to an intellectual challenge.

Kagan has also found that children who are noticeably bashful during the first three years of life are apt to remain noticeably different from their peers into adolescence and beyond. They continue to be withdrawn and tend to be dominated by more outgoing children; they are less apt to be athletes and less apt to choose traditionally masculine careers. And although there are no apparent cognitive differences among timid and outgoing children, Kagan notes that, of a small sample of timid children followed into adulthood, none have chosen an intellectual career.

The individual differences identified by Kagan parallel those identified by Suomi in his recent studies of Rhesus monkeys. In research to determine why the effects of certain early experiences endure while others do not, Suomi identified a group of what he calls "uptight" monkeys — monkeys who are overly fearful and overly reactive to stress. Unlike calmer monkeys, uptight monkeys display certain physio-

logical changes — an altered heart rate and an elevated plasma cortisol level — in the face of even mild social and environmental stress. He estimates that from 10 to 25 percent of the monkeys he has studied show such timidity.

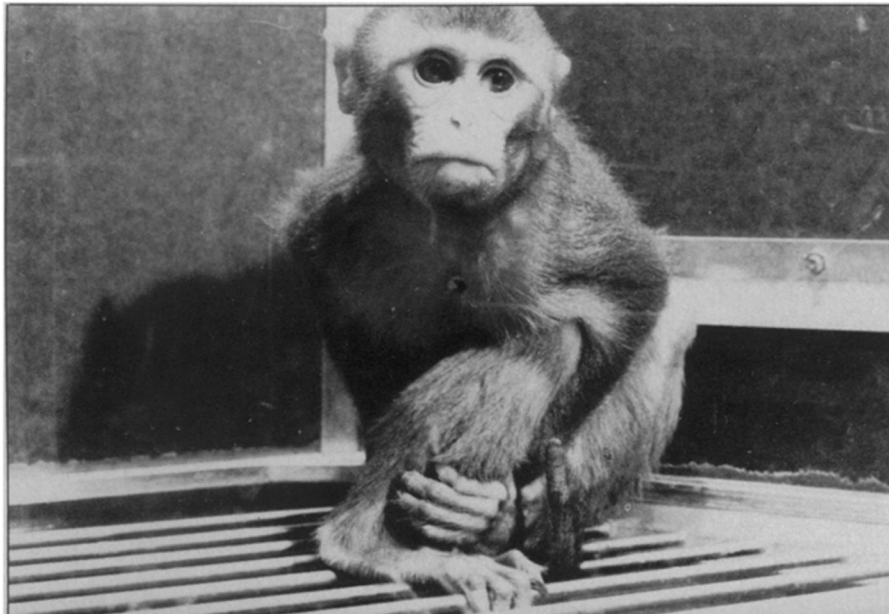
Abnormal anxiety is noticeable in monkeys as early as one month, Suomi says, and can predict behaviors well into adolescence. Uptight monkeys continue to react fearfully to stress and they also tend later on to be depressed — when they are separated from others, for example. If they have children, they are often depressive mothers, neglecting or even abusing their children. There is also some evidence, though still inconclusive, Suomi says, that uptight monkeys tend later on to be more attentive to their environment. "The important question now is whether these uptight monkeys are the same as Kagan's vigilant children," Suomi says. "My gut feeling is that they are."

Both Suomi and Kagan point to strong evidence of a genetic contribution to such tendencies toward fearfulness. Suomi notes that half-siblings among Rhesus monkeys tend to share temperamental characteristics, and Kagan similarly points out that identical twins are more similar to one another — either timid or outgoing — than are fraternal twins. In addition, Kagan says, closely related species of monkeys react quite differently to the same form of stress. Neither researcher is ready to dismiss the importance of the prenatal environment in contributing to a child's natural shyness, however. Kagan, in fact, suggests that these children may tend to withdraw from the unfamiliar rather than become excited because of the makeup of their nervous system, which may be affected by the prenatal chemical environment. Psychological stress during the early weeks of pregnancy, when the fetus's nervous system is differentiating itself, is a possible cause, Kagan says.

Suomi and Kagan are interested ultimately in whether or not early timidity is reversible. So far, Suomi reports, he has only been able to suppress severe anxiety in monkeys by raising them in a low stress environment; he does not yet know whether or not they can be taught to overcome their natural tendencies and grow into "laid back" adults. With children — at least American children — there is evidence that temperament might be moderated with time. Kagan emphasizes that among the infants he has studied, none of those who were originally outgoing became bashful as they aged, whereas one-third of the very shy infants gradually overcame their shyness. The ones who did become more outgoing were not the ones with the characteristic heart rate, though Kagan holds out the possibility that even the biologically bashful may adapt to the demands of American culture. Though it is not the same in all cultures, he notes, "In America, we don't like fearful kids."

— W. Herbert

Certain Rhesus monkeys, apparently born nervous, grow into depressive adults.



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