

II. HOW GENDER REALLY HAPPENS IN THE BRAIN

Human nature hardwires gender into our brains in three biological stages. The first stage has been clarified by genetics research, the second by endocrinological research, and the third by psychosocial research.¹

Stage 1. Chromosome markers for gender are included in the genomes of girls and boys at the time of conception. Researchers at UCLA have identified chromosome markers—built into the fetal brain—for the development of a male and female.

Stage 2. Those chromosome markers compel surges of male and female hormones in the womb that format XX brains to be female and XY brains to be male. In-utero bombardment of hormones into the brain occurs with intense frequency between the second and fifth months of gestation. Researchers at various universities around the world, including the University of London, McMaster University in Canada, UCLA, and the University of Pennsylvania, can now trace the development of gender in the fetal brain via bombardments of testosterone and other hormones.

Stage 3. The child is born a boy or girl, sending nonverbal and then verbal cues to parents, the nurturing community, and the larger culture. These cues are biological—based in the child's genetics and hardwiring. Mom, Dad, and extended family, then teachers, schools, and community members like you, like us, read the male and female signals, cues, and characteristics. These signals and readings are now being visually traced through SPECT and PET scan research in attachment theory, conducted in many parts of the world, including the University of Denver and Harvard University.

It's important to remember that none of these researchers is involved in a nature-*versus*-nurture framework. All this research recognizes the *vast*

interplay [among] genetic, hormonal, neural, and social forces. All the researchers also recognize that maleness and femaleness are things we start out with: we are born with them. Although it was popular thirty years ago to believe otherwise, scientific research in our era has put to rest the idea that gender is completely a matter of nurture. Gender is inborn and then it becomes socialized by cultures.

Why is the human genome, brain, and bonding system set up to be male and female by nature? No researcher can be completely sure. People with a religious base for understanding

DID YOU KNOW?

- As of four days of age, girls tend to spend twice as much time as boys maintaining eye contact with adults. Bonding chemistry and the visual cortex of boys and girls already differ at four days old.
- By four months of age, boys are less likely than girls to distinguish between a known individual and a stranger. Memory centers as well as spatial-mechanical pathways already work differently in boys and girls. Male babies are in general more inclined than female babies to spend more time during a day looking at objects moving in space—for instance, mobiles hung from a ceiling. Girls, in contrast, are more likely to turn their gaze immediately to their caregivers.
- Infant girls also pay closer attention to the words of caregivers. Verbal centers are developing in the female brain more quickly than in the male.
- Little boys, when given dolls to play with, more often than girls pull the heads off, hit them against a table, throw them in the air, or generally engage in some kind of physical, kinesthetic, or spatial play with the dolls. Girls, in contrast, from very early in life, begin to use words with the doll. Given how much earlier the female centers for verbal communication develop in the brain, this comes as no surprise. Because of higher levels of oxytocin, girls form bonds with objects that boys merely use as physical learning tools.²