

New Evidence for Biological Influence on Gender

by Linda Ames Nicolosi

A study recently published in the Proceedings of the National Academy of Sciences (April 16, 2002) has added to a growing body of research which suggests that environmental toxins have a demasculinizing effect on some developing organisms.

The latest study¹ was conducted by a specialist in the hormone systems of amphibians at UC Berkeley. He found that male tadpoles exposed to a commonly used weed killer called atrazine tend to develop into demasculinized adult frogs. Some of the tadpoles became hermaphrodites, developing both male and female sex organs.

Hayes found that atrazine disrupted the endocrine systems of developing frogs by converting the male hormone testosterone into the female hormone estrogen.

Atrazine is the most commonly used herbicide in the U.S., and it has been detected in ground water consumed by humans, although its effect on humans is not yet fully understood.

The latest study adds to earlier evidence suggesting that some environmental pollutants may impair normal gender development. If these findings are replicated in the small but growing body of studies on humans, then a male fetus with a brain that was feminized by an environmental toxin such as atrazine would, after birth, be at particular risk to establish a weak masculine gender identity and thus to develop homosexual attractions in adulthood.

This latest study on frogs fits earlier findings in research on humans by LaLumiere et al.² That earlier study concluded that male homosexuals are about one-third (31%) more likely than heterosexuals to be left-handed, while lesbians are almost twice as likely (91%) to be left-handed as heterosexual women. LaLumiere believes this indicates that homosexuality, for a certain proportion of men and women, probably has an early, neuro-developmental basis tracing back to "disruptive events causing developmental instability" which have modified sexual differentiation of the brain, "perhaps through hormonal or immunological mechanisms."

Homosexuality is generally understood to result from a combination of psychological, biological, and social factors. In those homosexuals whose condition had a primarily biological rather than a psycho-social foundation, homosexu-

ality would be, like left-handedness, a "biological developmental error."

Left-handedness has been associated with a wide range of indicators of reduced fitness, from the standpoint of natural selection. Left-handed people, La Lumiere et al. say, have a smaller number of offspring, higher number of spontaneous abortions, lower birth weight, higher number of serious accidents, higher rates of serious disorders, and a shorter life span. Left-handedness has similarly been linked to neural tube defects, autism, stuttering, and schizophrenia.

Two other studies reported earlier in *Archives of General Psychiatry* found significantly higher levels of pathology in the homosexual population than among heterosexuals. One of several possible explanations for the higher level of psychiatric pathology, said researcher J.M. Bailey in a published commentary that echoed the LaLumiere study, is that since natural selection leads to heterosexuality, then "homosexuality may represent developmental error."³

When gender-identity distortion becomes apparent in a young child, whether due to psychodynamic or biological factors, some therapists say, the at-risk child's gender distortions can be modified (see "Research Studies of Interest, the Childhood GID Diagnosis," at www.narth.com). Parental interventions that help to affirm appropriate gender identity would thus make a heterosexual adjustment more likely. ■

Endnotes

1. Hayes, Tyrone; Collins, Atif; Lee, Melissa; Mendoza, Magdalena; Noriega, Nigel; Stuart, A.A., and Vonk, Aaron, "Hermaphroditic, demasculinized frogs after exposure to the herbicide atrazine at low ecologically relevant doses," *Proc. Natl. Acad. Sci. USA*, vol. 99, Issue 8, 5476-5480, April 16, 2002.
2. Lalumière, M.L.; Blanchard, R.; Zucker, K.L. (2000): "Sexual orientation and handedness in Men and Women: a meta-analysis." *Psychological Bulletin* 126, no. 4, 575-592.
3. Bailey, J.M., "Commentary: Homosexuality and Mental Illness," *Archives of General Psychiatry*, October 1999, vol. 56, no. 10, 876-880.