Biosocial models of deviant behavior

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Abstract. This article describes biological influences on criminality. It presents illustrative data suggesting a biological sex difference in criminality and heritable differences in this trait among individuals. Next, methods of isolating environmental influences are described, including shared environmental effects, gene x environment interactions, and nonshared environmental effects. Using research designs that include just one level of genetic relatedness (e.g., full siblings) is scientifically a poor choice. Using environment-friendly behavior genetic research designs is both proper and would offer many avenues for environmental analysis.

Key words: Criminality, Environment, Heritability, Nurture

Introduction

This conference is concerned with biosocial models of behavior. Of particular concern to society are those deviant behaviors where one person violates others’ personal rights. I will call such a pattern of behavior ‘criminality’; it includes manipulative lying, stealing other’s property, and using violence against others. In severity it ranges from the vandalism to murder; from the neighborhood punk to the L.A. gang member Monster Kody Scott (Shakur 1993). Criminal acts directed towards neighbors or kin are intolerable in all cultures. Yet in every culture they occur, and some individuals establish reputations for extreme lawlessness.

I have two goals in this presentation. One is to establish that criminality has a biological basis that results when genetically-disposed individuals are both exposed to and find environments that encourage crime. The second is to discuss how to estimate environmental effects and gene x environment interactions using behavior genetic research designs.

Biological variation and criminality

Two kinds of biological variation have been associated with criminality. One is maleness, the mere presence of the Y chromosome. The prevalence of criminality is greater in males than females (Wilson & Herrnstein 1985). This sex-difference exists in the USA and across the world; no culture has been
Figure 1. Play minutes with male typed toys in control girls and congenital adrenal hyperplasia (CAH) girls.

discovered in which men were not the major perpetrators of serious crimes. One observation illustrates this nicely (Daly & Wilson 1988). Adult men kill other adult men. Adult women don't kill other women. Although women may be victims by the hands of their spouses or lovers, it is extremely rare in all societies for one woman to kill another.

I believe that the causes of this sex difference lie in sex differences in the brain. Such sex differences arise from hormonal effects on the brain. The basic pattern of brain development is female; unless the fetal brain receives a dose of testosterone, an XY fetus develops in a female rather than in a male direction. In one catchy simile, hormones work like light and chemicals on a photograph; the picture is set by exposure to prenatal testosterone, and it is developed by exposure to pubertal testosterone (Ridley 1993: 255). In boys, this double-dosage effect masculinizes the brain and would lead to many male-typed behaviors, from minor ones like toy preference to major ones like aggression. In females, the hormonal effects would be absent, and so female, but not male, preferences would develop.

I don't have time to review the extensive literature on the power of sex hormones. However, let me illustrate it with one finding on the effects of hormonal exposure on girls' play preferences. Figure 1 shows the amount of time girls in two groups freely chose to play with boy-typed toys (e.g., cars), when given a choice between boy- and girl-typed toys. Two groups of girls are shown: (1) girls with partially masculinized brains due to a genetic disorder of adrenal hormones, and (2) a control group of their sisters and cousins. The affected girls chose boy-toys more frequently than their normal