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PSYCHIATRY, SOCIOPATHY AND THE XYY
CHROMOSOME SYNDROME

DAVID B. SAXE*

1. *Introduction*

On October 13, 1968, Daniel Hugon, a tall, chronic drifter of low mentality was convicted by a French court for the strangulation-murder of an elderly prostitute in the Pigalle district of Paris. Daniel Hugon has an XYY chromosome.¹

In the summer of 1966, eight nurses were brutally murdered in Chicago. Richard Speck, who was convicted of the mass murder, is a tall individual of low mentality and acned faced, who has spent a considerable period of his life in conflict with law enforcement authorities. He, also, has an XYY chromosome syndrome.

On October 9, 1968, Lawrence E. Hannell was acquitted on the grounds of insanity of the murder of a seventy-seven year old widow. Lawrence E. Hannell is tall and has an XYY chromosome syndrome.²

On August 22, 1968, Mrs. Margaret Burke was raped and murdered in Queens County, New York City. The murder was extremely vicious. Sean Farley, a six foot eight inch giant, possessed with the XYY chromosome complement and a past history of anti-social behavior, was convicted of the murder.³ For the first time in the United States, the defense attempted at the trial stage to prove that this deviant chromosome structure coupled with a past history of psychiatric difficulties made the defendant incapable of formulat-

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¹ NEWSWEEK, May 6, 1968, at 87.

² TIME, Oct. 25, 1968, at 76.

³ N.Y. Times, April 16, 1969, at 54, col. 6.

ing the necessary *mens rea* to commit murder.⁴ This attempt to prove a genetic theory of insanity failed and Farley was convicted. Yet, some fascinating questions are presented in these few cases.

Shall a man be legally absolved of a criminal act by virtue of his chromosome structure? This question, in particular, is of more importance than the few appeals and trials utilizing the XYY chromosome structure as a defense, may seem to indicate. In recent years, relatively large numbers of XYY chromosome structured males have been discovered in prisons, maximum security hospitals for the criminally insane, and mental institutions. The emerging theory of criminal responsibility or lack of it, as related to the existence of an extra Y chromosome, the male sex chromosome, is based on inconclusive data relating the incidence of this genetic deformity in the general population and criminal population. It has been postulated that since a higher incidence of the XYY chromosome defect is found in hospitals for the criminally insane than in the general population, many of the patients in the former are predestined to a life of crime. If these men are impelled to commit criminal acts due to this genetic abnormality, can we say that such men are legally or morally responsible for their acts? Should such individuals be acquitted of crimes within the traditional grounds of the insanity defense because of their XYY chromosome structure? These are just some of the imponderables that are presented to a defense attorney who seeks to utilize this theory of genetic "predestination"⁵ as a partial or total defense to a criminal act.

Initially, our discussion will focus on the physiological aspects of the genetic structure leading to a discussion of the latest clinical findings by physicians on the XYY com-

⁴ See generally Mueller, *On Common Law Mens Rea*, 42 MINN. L. REV. 1050 (1958).

⁵ See *Predestination*, 36 SCIENCE TEACHER 18 (1969). (1969).

plement. Finally, an attempt will be made to incorporate these medical findings into the legal structure of insanity.

II. Genetics⁶

Each normal body cell contains 46 chromosomes, 22 pairs of autosomes and 2 sex chromosomes, XX for the female and XY for the male. Each chromosome contains smaller structures called genes, which transmit many physical characteristics from one generation to the next. Basically, the genes contain the instructions for the development of most of our physical characteristics. Genetic structure and balance are extremely complex. A lack or excess in the chromosome number can permanently disable an individual.

In the normal genetic process, the sperm cells will be of X or Y consistency; while the ovum or egg is always X. Hence, the man always determines the sex of the child. Each parent contributes one-half to the genetic make-up of the child. The sperm and the ovum both contain 23 chromosomes. Upon unification the resulting cell contains 46 chromosomes which is the normal number:

Sperm	Ovum	
22 Autosomes + X	+ 22 Autosomes + Y	= 44A + XY or <i>Male</i> .
	— or —	
22 Autosomes + X	+ 22 Autosomes + X	= 44A + XX or <i>Female</i>

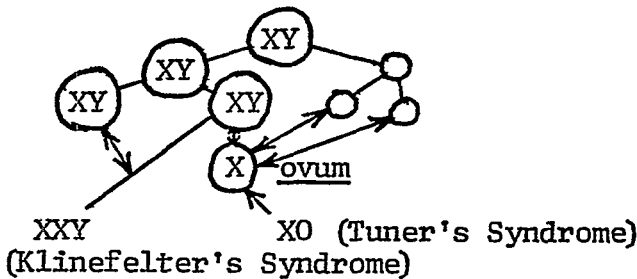
There are two methods of producing the XYY complement. The first occurs in *meiosis* of the primary spermatocyte which contains both an X and Y chromosome. Normally, the primary spermatocyte will split by a process known as meiotic division into an X and Y sperm, both of which will split into two more X and Y sperms, etc. The sperm cell, however, may split improperly at either the first or secondary meiotic level. This is termed meiotic non-disjunction

⁶ See generally, J. FULLER & W. THOMPSON, *BEHAVIOR GENETICS* (1960); Montagu, *Chromosomes and Crime*, *PSYCH. TODAY*, Oct. 1968, at 42-49; Stock, *The XYY and the Criminal*, *N.Y. Times*, Oct. 20, 1968, § 6 (Magazine).

which leads to the formation of sperm cells which contain extra X or Y chromosomes. The result may then be a sperm cell not with one X or one Y chromosome fertilizing an X ovum but a sperm cell containing extra chromosomes which will result in an ovum with more sex chromosomes than the normal XY male or XX female:

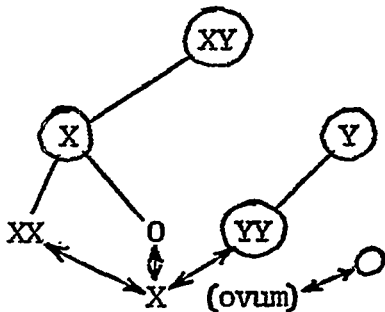
1. *Non-Disjunction—1st Meiotic Division*

Primary Spermatocyte



2. *Non-Disjunction—2nd Meiotic Division*

Primary Spermatocyte



Offspring

- 1 XXX (Super-female)
- 2 XO Turner's Syndrome
- 1 XYY

The second method by which an XYY is formed is through a process known as mitosis which is the splitting of the fertilized ovum. A normal XY ovum splits into 2 cells of XY composition, which subsequently multiply. If however, mitotic non-disjunction occurs, we see the XY cell dividing into two cells, one of XO (no Y) composition and the other of XYY:

*Normal Mitotic Division*1. *fertilized ovum*

2 cells

XY---XY-----XY XY-----to be a normal male

*Mitotic Non-disjunction*2. *fertilized ovum*

XY---X XYY-----XO XYY-----to be an XYY male
(possible female)

There remains the unanswered question as to what extent does genetic composition control the behavior of a person. The connection between genetic composition and behavior is complex. The genes do not control behavior directly. Hormones, enzymes, etc., are regarded as the successively complex intermediaries between the genes and psychological characteristics.⁷ Similarly, scientists are not sure of the effects which various environments can have on persons with differing chemical and/or genetic composition. There are studies linking certain behavioral disorders such as schizophrenia, and manic depressive reactions⁸ to chromosomal mosaicism. Mental capacity and intellectual ability would seem to be closely related to genetic determinations.⁹

It may reasonably be inferred that if a schizophrenia can lead to certain bizarre behavior, possibly due to chromosomal structure, then it would seem possible that anti-social behavior, resulting in individual conflicts with the law, could be determined by genetic composition over which the individual has no control.

III. *Clinical Findings*

This section will deal with the findings of physicians, psychiatrists, geneticists and cytologists. These findings have

⁷ J. FULLER & W. THOMPSON, *supra* note 6, at 327.

⁸ *Id.* at 284.

⁹ Brut & Howard, *The Multifactional Theory of Inheritance and Its Application to Intelligence*, 9 BRIT. J. STAT. PSYCH. 95-131 (1956).

generally been conducted in maximum security prisons and hospitals for the criminally insane, their purpose being to show the behavioral and psychological characteristics of the XYY individual.

The early research pertaining to the XYY individual indicated that such persons are often tall, acned faced, of sub-normal intelligence, violent and with a tendency toward and a history of bizarre sexual acts.¹⁰ Recent research has detected additional quantities of testosterone, the hormone primarily responsible for the development of the secondary male sex characteristics in some XYY individuals.¹¹

IV. *Legal Aspects*

A. *Problems of Evidence*

The studies that have been conducted with regard to the XYY chromosome complement will have legal utility only if the evidence adduced from these studies are admissible in courts of law. The insanity defenses, utilizing evidence dealing with the mental processes of an individual and which is the most meaningful device for the avoidance of criminal penalties will probably remain the most productive vehicle for the introduction of evidence on the XYY complement.

¹⁰ See generally Jacobs, *Agressive Behavior, Mental Sub-normality and the XYY Male*, 208 NATURE 1351 (1965); Price, *Criminal Patients with XYY Sex Chromosome Complement*, 1 LANCET 565 (1966); Hope, *Psychological Characteristics Associated with XYY Sex Chromosome Complement in a State Mental Hospital*, 113 BRIT. J. PSYCH. 495 (1967); Jacobs, *Chromosome Studies on Men in a Maximum Security Hospital*, ANN. HUM. GENET. 339 (London 1968); Casey, *XYY Chromosome and Antisocial Behavior*, 2 LANCET 859 (1966); Hunter, *Chromatin-Positive and XYY Boys In Approved Schools*, 1 LANCET 816 (1968); Welch, *Psychopathy, Mental Deficiency, Aggressiveness and the XYY Syndrome*, 214 NATURE 500 (1967); Sandberg, *XYY Genotype*, 268 NEW ENG. J. MED. 585 (1963); Wilton & Lever, *XYY Male*, 41 S. AFR. MED. J. 284 (1967).

¹¹ R. WILLIAMS, TEXTBOOK OF ENDOCRINOLOGY 317 (1950).

In order to properly formulate an insanity defense, an attorney defending an XYY individual will undoubtedly want to call on both a psychiatrist and a geneticist to offer expert testimony predicated upon a reasonable degree of medical certainty with respect to causation.¹² The problem of the admissibility of the evidence deals with whether the expert can with a reasonable degree of medical certainty, establish a causal link between the abnormality and a condition which is relevant to the criminal law.¹³ Although abnormal behavior has been found in a large degree in the XYY population,¹⁴ a causal relationship between the abnormal behavioral manifestations has not been proven. Until the time when the expert is prepared to state with reasonable medical certainty that the XYY chromosome complement causes behavioral disorder in the defendant, the expert's testimony will be inadmissible in a criminal proceeding.¹⁵

B. *Insanity Defense*

The insanity defense, represented primarily by four theories of law, allows a criminal defendant to prove that he did not possess the minimum mental condition at the time the act was committed.¹⁶ Unfortunately the insanity plea is an all or nothing proposition. Either the accused was sane at the time the criminal act was committed and hence responsible for his act, or insane and thus not responsible. The XYY chromosome complement, although a genetic or physical

¹² Baird v. Cincinnati Transit Co., 110 Ohio App. 94, 168 N.E. 2d 413 (1959).

¹³ Macal v. Chicago Tumor Inst., 9 Ill. App. 2d 389, 132 N.E. 2d 809 (1956).

¹⁴ See *supra* note 10.

¹⁵ But see Johnson v. Wilson, 97 So. 2d 674, 682 (La. 1957), *aff'd in part and rev'd in part on other grounds*, 239 La. 390, 118 So. 2d 450 (1960) (allowing expert testimony based on mere possibility).

¹⁶ H. WEIHOFFEN, MENTAL DISORDER AS A CRIMINAL DEFENSE 321 (1954).

malady, will be admissible in an insanity defense if it can be proven that it can cause a mental disorder.

1. *M'Naghten Rule*

In most American jurisdictions, the standard of mental responsibility is based on the rules set out in the famous *M'Naghten* case.¹⁷ That court stated that for an insanity defense to be properly established,

it must be clearly proved that, at the time of the committing of the act, the party accused was laboring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing; or, if he did know it, that he did not know that he was doing what was wrong.¹⁸

Within the meaning of the *M'Naghten* test, the crucial problem is whether the XYY syndrome is a "mental disease" and whether the XYY individual can be said to lack the required *mens rea*.

The "disease of the mind" requirement of *M'Naghten* should not prove to be a barrier to admission of evidence relating to the XYY syndrome because an XYY person who has displayed difficulty in controlling his behavior may be afflicted by some mental disorder and it is arguable that evidence of the XYY complement will provide insight into the mental condition of the defendant. Consequently, the "disease of the mind" requirement would be fulfilled.

The greatest difficulty with the *M'Naghten* rule exists in the knowledge requirement of the rule. Despite the presence of the XYY chromosome abnormality, a defendant pleading insanity in a *M'Naghten* jurisdiction will be convicted unless he can prove that the chromosome defect made it impossible for him to understand the nature and quality of his act or that his act was wrong. Possibly the only use

¹⁷ 8 Eng. Rep. 718 (H.L. 1843); see Annot., 45 A.L.A.2d 1447 (1956).

¹⁸ 8 Eng. Rep. at 722.

that can be made of the XYY evidence in a M'Naghten jurisdiction is in the situation where the defendant exhibits some behavioral disorder, not alone sufficient to convince the jury that he was afflicted with a mental disease. If the defendant can establish independently a lack of mental ability, the XYY evidence will not be necessary.

2. Model Penal Code

The American Law Institute (ALI) in its Model Penal Code has proposed a definition of criminal irresponsibility not greatly different from the M'Naghten rule:

4.01—Mental Disease or Defect Excluding Responsibility

- (1) A person is not responsible for criminal conduct if at the time of such conduct as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality (wrongfulness) of his conduct or to conform his conduct to the requirements of law.
- (2) As used in this Article, the terms "mental disease or defect" do not include an abnormality manifested only by repeated criminal or otherwise anti-social conduct.

The problems presented in those jurisdictions adhering to the Model Penal Code insanity test is whether the XYY condition is a mental disease or defect, and whether due to this condition the defendant lacked capacity to appreciate the wrongfulness of his conduct or was unable to conform his conduct to legal requirements. Although evidence of the XYY is admissible to prove a mental disease or defect since it is probably probative of disorder,¹⁹ the defect under this test as well as M'Naghten will not help in establishing a lack of knowledge. Where a complete lack of mental control to sustain a defense of criminal irresponsibility is not required, the XYY individual might receive more leniency from a jury.²⁰

¹⁹ See A. GOLDSTEIN, *THE INSANITY DEFENSE* 47 (1967).

²⁰ MODEL PENAL CODE § 4.01, Comment 4.

3. "Irresistible Impulse"

The "irresistible impulse" or control test has been adopted in about fourteen jurisdictions and three federal circuits.²¹ The test provides:

A person who knew he was committing an act which was morally wrong and prohibited by law may nevertheless be excused from responsibility if he lacked the power of conscious volition and inhibition (will-power) to resist the impulse to commit it.²²

Under this test, the only requirement is that a mental disorder caused the lack of control. The XYY aberration would most likely be considered probative of an inability to control behavior if it can be proven that the XYY individual has difficulty in preventing himself from acting in a violent and aggressive fashion. However, under these tests, only a complete inability to control would suffice in order to free the accused from responsibility; a "substantial difficulty" might not be enough.²³ If medical research can prove satisfactorily that at all times the XYY was unable to control his behavior then the XYY chromosome defect will be sufficient to sustain an insanity plea in a state following the "irresistible impulse" test.

4. The Product Test

This test, adopted in three jurisdictions, states that:
 . . . [a]n accused is not criminally responsible if his unlawful act was the product of mental disease or mental defect.²⁴

This rule, known as the *Durham* rule, defines mental disease as any abnormal condition of the mind which substantially

²¹ Keedy, *Irresistible Impulse as a Defense in the Criminal Law*, 100 U. PA. L. REV. 956 (1952).

²² H. WEIHOFFEN, *supra* note 16 at 81.

²³ See MODEL PENAL CODE § 4.01 (The control tests require a complete impairment of capacity); *Castro v. People*, 140 Colo. 493, 346 P.2d 1020 (1959).

²⁴ See *Durham v. United States*, 94 U.S. App. D.C. 228, 214 F.2d 862 (1954).

affects mental or emotional processes and substantially impairs behavior controls. Evidence of the XYY syndrome should be admissible under the *Durham* rule because the personality patterns of the XYY individual indicate an abnormal condition of the mind and the socially aggressive behavior of the XYY individual points to "impaired behavioral controls."

5. *Additional Concepts of Criminal Irresponsibility*

Unless a court can make a finding of insanity, the criminal law does not seek to understand the uniqueness of the mental deficiency of the criminal defendant. The problem of incorporating the XYY syndrome into existing insanity defenses can be tortuously accomplished; although this route in addition to the various proposals for expanding the definition of mental illness does not reflect an enlightened awareness on the part of criminal justice to new medical discoveries. A proper legal recognition that certain organic disturbances²⁵ relate to criminal behavior might free courts from attempting to pigeonhole the insanity defense into medical fictions. One commentator has suggested an alternative concept, "blame-worthiness" as the standard of insanity.

Under a system based on this concept, the defendant could introduce a wide range of evidence to the jury in determining whether or not they would hold him blameworthy for his act. The evidence admissible under this system would include not only facts probative of his mental condition, but also biological, sociological, and other factors that might justify his conduct. The jury would then be free to give whatever weight they chose to this evidence in determining the degree of criminal liability of the accused . . .²⁶

The adoption of the concept of "diminished capacity," a civil law development, might also be utilized. A criminal defendant under this theory would receive less than a full sentence if it is found that he is less than fully culpable.

²⁵ See generally Podolsky, *The Chemical Brew of Criminal Behavior*, 45 J. CRIM. L. CRIMINOL & POL. SCI. 675 (1955).

²⁶ Note, *Chromosome Defense*, 57 GEO. L.J. 889 (1969).

Another possibility is the adoption of an individualized disposition of offender system in which a penal code without sanctions would be established. Upon conviction a disposition hearing which would hear all relevant psychological and sociological evidence would be held and a panel of experts would then be able to determine punishment from a wide spectrum of treatment or criminal detention disposition methods.

An attorney representing an XYY criminal defendant should not, if a jury refuses to accept the XYY defect as evidence of insanity, accede to the proposition that such evidence is therefore useless. In approximately ten states a jury can utilize testimony relating to insanity to return a verdict of guilty, although guilty of a lesser degree of criminality.²⁷ For example, a defendant might be prosecuted for murder in the first degree, but the jury could, as many civil law countries allow, return a verdict of murder or manslaughter in the second degree. Four states do not allow the specific intent to be negated in this manner. In the remaining jurisdictions, this procedure is either in a state of flux, unclear, or simply unavailable to the criminal defendant at trial.

V. *Society and the XYY Individual*

Should the XYY individual be unable to gain acquittal by reason of insanity and, thus, receive a fixed sentence, the termination of this sentence will present serious problems for society. The XYY individuals' propensity toward anti-social behavior is rooted in a genetic malformation not likely to change during incarceration. Hence, his release would again subject society to criminal danger. The decision is one of further custodial detention or release. Generally, the only way to renew or continue the detention of an individual who has completed a sentence is to institute civil commitment proceedings.²⁸

²⁷ H. WEIHOFFEN, *supra* note 16 at 174.

²⁸ See 18 U.S.C. § 4247 (1964); N.Y. CORREC. LAW §§ 383, 385, 408, 409, 438(c), 441 (McKinney 1968).

If the XYY individual has been acquitted by reason of insanity, disposition varies considerably among the several states. Since the XYY syndrome would produce a finding of permanent insanity, some type of commitment would follow. The conditions under which release could be effected for an individual committed after being acquitted by reasons of insanity also vary. Some states provide for release when the individual has been "cured";²⁹ others provide a test for release based on the concept of danger to himself and to others.³⁰ No well thought out definition of "cure" has yet been promulgated and it is likely that since the XYY chromosome defect will continue to exist, the XYY individual will probably remain committed.

Further research into the XYY complement may reveal that such an individual is likely to engage in anti-social behavior during his lifetime. Chromosome-typing of all newborn males could easily be accomplished.³¹ Once XYY males are identified, a program to provide care for them could be established taking into account the varying interests of society and the individual.

Some possibilities of rehabilitation exist especially among geneticists espousing the viewpoint that antisocial behavior is only partially determined by genetic makeup, another significant contributor being the individual's environment. A controlled or condition environment through required special schools or examination and reporting on the XYY's home environment might provide society with some reassurance.

Finally, the XYY might be placed under mandatory confinement through removal from his home environment and relocation in an appropriate supervisory environment. This

²⁹ See e.g., MICH. COMP. LAWS § 767.27(b) (1968).

³⁰ Goldstein & Katz, *Dangerousness and Mental Illness—Some Abbreviations on the Decision to Release Persons Acquitted by Reason of Insanity*, 70 YALE L.J. 225 (1960).

³¹ See J. LEJEUNE, *LES CHROMOSOMES HUMAINS* 535 (1965).

system threatens possibility of serious deprivation of individual liberties. However, it is suggested that a state would probably have the power to provide for such a program under its role as *parens patriae* in which the individual could be confined because of his dangerous proclivities. If the state were to utilize its police powers as a means of protecting society from a "dangerous" individual, it would have to show that the individual had exhibited certain criminal conduct and was likely to continue doing so.³² The constitutional limitations of such confinement programs may be found in the so-called "status" or "condition" cases which deal with the inability of the prosecuting authorities to convict and punish a man for his status or condition over which he has no control,³³ i.e., the chronic alcoholic and the narcotic addict. Appropriate analogies to the *XYY* individual might be profitably made.

VI. *Conclusion*

There are as yet, very few answers to the problems that the *XYY* individual presents. However, if our awareness that problems do exist in this area and will increase in complexity as our scientific knowledge in genetics and the behavioral sciences increase, then we are in a better position to judge. Any sound legal system must possess the capacity to grow and adapt itself to the surrounding environment of increased scientific knowledge.

It is possible that a greater rapport between the sciences and the law will result from the development of the *XYY* theory of criminal irresponsibility. The law it is hoped will not continue to exist in a world of its own. The demands and realities of science and other disciplines call for forward thinking legal responses.

³² See generally Note, *Civil Commitment of the Mentally Ill: Theories and Procedures*, 79 HARV. L. REV. 1288 (1966).

³³ See generally *Robinson v. California*, 370 U.S. 660 (1962) (narcotics addiction); *Driver v. Hinnant*, 356 F.2d 761 (4th Cir. 1966); *Easter v. District of Columbia*, 361 F.2d 50 (D.C. Cir. 1966) (public drunkenness).