

uals, or prohibit genetic discrimination, or eliminate economic incentives to discriminate. The last goal, for example, might be accomplished by providing health coverage to those with genetic disorders (or to everyone), or by discovering treatments and preventives that reduce the fateful significance of genetic difference. But until we can prevent as well as predict genetic disorders, we must use legal or economic tools to guard against potential misuse of genetic information. As this article will show, however, the laws on genetic privacy and discrimination, though well-intentioned, are ineffective, impracticable, ambiguous, inflexible, or too narrowly focused on genetics. The article concludes that creating a property interest in genetic information would not significantly increase the protection against misuse of genetic information afforded by informed consent requirements and other measures to protect privacy.

II. CURRENT LAW RELATING TO GENETIC PRIVACY AND DISCRIMINATION

Before considering the recent legislation specific to genetic information, the applicability of general privacy and anti-discrimination law should be noted. An interpretation of the Americans with Disabilities Act (ADA) by the Equal Employment Opportunity Commission (EEOC) may provide limited federal protection against genetic discrimination in employment. The ADA does not specifically mention genetics but clearly covers expressed genetic disorders to the same extent as impairments without a genetic component. Whether the ADA also covers unexpressed genetic predispositions and recessive traits is, however, unclear. The EEOC, which administers the employment provisions of the ADA, has taken the position that the ADA covers a genetic predisposition that is regarded as an impairment by an employer, but this position has not yet been upheld judicially. However, the Ninth Circuit Court of Appeals recently found that genetic testing of prospective employees by Lawrence Berkeley Laboratory could violate both the federal and California constitutional rights of privacy if the employees did not authorize the tests and had no reason to know that the tests were part of a general physical examination.

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n4. Americans with Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 327 (1990).

n5. See 2 EEOC Compliance Manual 902 (1995).

n6. See *Norman-Bloodsaw v. Lawrence Berkeley Lab.*, 135 F.3d 1260 (9th Cir. 1998) (reversing summary judgment against employees in part because material issues of fact existed as to whether the employees authorized or knew that a government-operated research facility employer was testing them for sensitive medical information).

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Last year, there was a flurry of state legislation regarding genetic privacy and discrimination. The number of states that prohibit genetic discrimination by health insurers more than doubled, to 23 states. Also, four states prohibited genetic discrimination by employers, bringing the total in this category to 11 states. In all, 13 states adopted laws last year to prohibit genetic discrimination in insurance and/or employment, bringing the total to 28 states that have enacted such laws since 1989. Earlier, several states had prohibited discrimination against carriers of recessive traits, like sickle cell anemia, that could affect only the carriers' offspring, but the recent laws also protect individuals with genetic anomalies that could affect themselves.

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n7. See 1997 Ala. Acts 97-721; Cal. Health & Safety Code 1374.7 (West 1998); Cal. Ins. Code 742.405, 10123.3, 10140 (West 1998); Colo. Rev. Stat. Ann. 10-3-1104.7 (West 1998); 1997 Conn. Pub. Acts 97-95; 1997 Fla. Laws ch. 97-182; Ga. Code Ann. 33-54-1 to 8 (1997); 1997 Haw. Sess. Laws 91; 1997 Ill. Pub. Act 90-25; Ind. Code Ann. 27-8-26-7 (Michie 1997); 1997 Kan. Sess. Laws 190; 1997 La. Acts 1418; Md. Code Ann., Ins. 223.1 (1997); Minn. Stat. 72A.139 (1997); 1997 Nev. Stat. 412; 1997 N.C. Sess. Laws 350; N.H. Rev. Stat. Ann. 141-H:4 (1996); N.J. Stat. Ann. 17:48-6.18, 17:48A-6.11, 17:48E-15.2, 17B:26-3.2, 17B-27-36.2, 26:2J-15.1 (West 1998); Ohio Rev. Code Ann. 1742.42, 3901.49, 3901.50 (Banks-Baldwin 1997); Or. Rev. Stat. 746.135 (1996); 1997 Tenn. Pub. Acts 121; 1997 Tex. Gen. Laws 1215; Va. Code Ann. 38.2-508.4 (Michie 1997); Wis. Stat. 631.89 (1996).

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n8. See 1997 Ariz. Sess. Laws 229; 1997 Ill. Pub. Act 90-25; Iowa Code Ann. 729.6 (West 1997); N.H. Rev. Stat. Ann. 141:H-3 (1996); N.J. Stat. Ann. 10:5-12 (West 1998); 1997 N.C. Sess. Laws 350; N.Y. Exec. Law 296 (McKinney 1993 & Supp. 1997); Or. Rev. Stat. 659.036, 659.227 (1996); R.I. Gen. Laws 28-6.7-1 (1997); 1997 Tex. Gen. Laws 1215; Wis. Stat. 111.372 (1996).

n9. Specifically, Alabama, Arizona, Connecticut, Florida, Hawaii, Illinois, Indiana, Kansas, Louisiana, Nevada, North Carolina, Tennessee, and Texas prohibited genetic discrimination last year.

n10. In addition to the 13 states listed supra note 9, California, Colorado, Georgia, Iowa, Maryland, Minnesota, Montana, New Hampshire, New Jersey, New York, Ohio, Oregon, Rhode Island, Virginia, and Wisconsin have prohibited genetic discrimination.

n11. See, e.g., Cal. Health & Safety Code 1374.7 (1993).

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\5B*657\5D Nearly all the laws on genetic discrimination incorporate measures to protect genetic privacy. Also, four states have declared that genetic information is the property of the individual to whom the information pertains.

n12 In New Jersey, however, the legislature adopted genetic anti-discrimination legislation in 1996 only after a declaration that genetic information is the property of the individual was deleted at the insistence of the governor. That action was prompted by a complaint from a biotechnological industry organization that characterizing genetic information as property could create conflicts over ownership rights that will slow research and development efforts and likely foment unnecessary litigation.

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n12. See, e.g., Colo. Rev. Stat. Ann. 10-3-1104.7(1)(a) (West 1998); Ga. Code Ann. 33-54-1(1) (1997); 1997 La. Acts 1418; Or. Rev. Stat. 659.715(1) (1996) (as amended by 1997 Or. Laws 780).

n13. Philip R. Reilly, Governor Not Expected to Sign New Jersey Genetic Privacy Act, (visited Sept. 1, 1996) <<http://www.geneletter.org/0996/governor.htm>>.

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Most states have also adopted portability and access laws that limit preexisting condition exclusions and bar discrimination based on genetic information or, more broadly, health status in determining eligibility to enroll in group health insurance plans. n14 Following the terms of the federal Health Insurance Portability and Accountability Act of 1996, n15 the states adopted these laws in 1997 in order to preserve their jurisdiction over insurers. n16 The portability and access laws add little protection against discrimination, genetic or otherwise, because they apply to plans that do not look at individual employees' records but determine their eligibility for health coverage solely on the basis of their employment. n17

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n14. See, e.g., 1997 Ark. Acts 997. \par\par

n15. Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191, 110 Stat 1936 (1996). \par\par

n16. The U.S. Department of Health and Human Services is responsible for enforcing Health Insurance Portability and Accountability Act provisions in states that do not pass and enforce laws imposing similar protections. U.S. General Accounting Office, Health Insurance Standards: New Federal Law Creates Challenges for Consumers, Insurers, Regulators, GAO/HEHS-98-67 (1998) at 5 (available at <<http://frwebgate.access.gpo.gov/cgi-bin/useftp.cgi?file=publaffairs/access.gpo.gov&filename=98067.txt&directory=5Bfc/d/5Diskb/wais/data/gao>>). \par\par

n17. See generally Health Insurance Portability and Accountability Act of 1996, supra note 16. \par

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One way to protect genetic privacy is to increase the protection of medical privacy generally, including genetic data. Unfortunately, medical privacy is a myth today. Our medical records are not well protected in hospitals, doctors' offices, employers' records, or pharmacies. Computerization has exposed medical records to a variety of worthy and not-so- worthy enterprises.

Federal protection of medical records is coming, by law and/or regulation. n18 and it will surely increase genetic privacy. The advantages of protecting genetic privacy as a subset of medical privacy include avoiding the problems of (1) defining what information is genetic and (2) justifying special protection for genetic information (we shall return to these issues). However, even enhanced medical privacy rules will not protect genetic information in non-medical contexts, such as genetic research unrelated to medical care or testing conducted by employers and insurers. \par

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n18. The present Congress is considering several comprehensive health privacy bills. Also, the '22administrative simplification'22 provisions of the Health Insurance Portability and Accountability Act of 1996 require the Department of Health and Human Services to adopt uniform national standards, including measures to protect confidentiality, for the electronic processing of insurance claims. \par

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Therefore, many have argued for a special embargo on disclosure of genetic i

nformation, like the protection afforded movie rental records. n19 In fact, as noted above, about half the states have laws of various sorts to protect genetic privacy. These measures include prohibitions on requiring a genetic test or disclosure of previous test results as a condition of employment. n20 or insurance. n21 prohibitions on genetic testing or disclosure of genetic information without informed consent. n22 and statutory declarations that genetic information is confidential. n23 Provisions like these can provide some assurance of genetic privacy. Not all genetic privacy measures will guard against genetic discrimination, however. Merely requiring informed consent for genetic testing will not prevent an employer or insurer from insisting on testing as a condition of employment or insurance. An applicant can refuse testing but only at the cost of not becoming employed or insured. Unless testing itself or the use of test results is prohibited, the privacy protection is of limited value.\par

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n19. See 18 U.S.C.A. 2710(i) (1996) (consumer privacy protection law providing a remedy for wrongful disclosure of video tape rental or sale records).

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n20. See, e.g., Iowa Code Ann. 729.6(2)(a) (West 1997). \par\par

n21. See, e.g., Wis. Stat. 631.89(2) (1996). \par\par

n22. See, e.g., Cal. Civ. Code 56.17 (West 1998); N.J. Stat. Ann. 10:5-45 (West 1998). \par\par

n23. See, e.g., N.Y. Civ. Rights Law 79-1.3 (McKinney Supp. 1997). \par

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For example, New York requires all insurers to obtain informed consent for genetic testing but does not prohibit use of the test results for underwriting.

n24 Several states require life insurers to obtain informed consent for genetic testing. n25 but no state bars life insurers from discriminating on the basis of genetic information about an individual, provided the differential treatment is actuarially supported. n26 Thus, life insurers may not conduct genetic testing without informed consent, but they may deny insurance to an applicant who refuses to be tested or who is tested and found to have a genetic anomaly that reduces life expectancy.\par

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n24. See N.Y. Ins. Law 2612 (McKinney Supp. 1997). \par\par

n25. See, e.g., Minn. Stat. 72A.139(5) (1997). \par\par

n26. See, e.g., Cal. Ins. Code 10148(e) (West 1998); Ariz. Rev. Stat. Ann. 20-448E (West 1997). \par

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Finally, prohibiting genetic discrimination does not have to incorporate privacy laws. A few states that bar genetic discrimination do not have any provisions to guard the privacy of genetic information. n27 New York bars employers from discriminating on the basis of genetic information, but permits them to require genetic testing, as a condition of employment, for a genetic anomaly that indicates an increased risk of disease as a result of working in the occupational environment. n28 Employers may deny employment for refusal to be tested, but not on the basis of the test results. The decision whether to work

in the risky occupational environment is left to the individual. Thus, New York permits employers to invade genetic privacy but not to discriminate on the basis of genetic information.

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n27. See, e.g., 1997 N.C. Sess. Laws 350. \par\par
n28. N.Y. Exec. Law 296(19)(b) (McKinney 1993 & Supp. 1997). \par
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III. DIFFICULTIES IN CREATING EFFECTIVE GENETIC ANTI-DISCRIMINATION LEGISLATION \par\par

A. Defining Genetic Information \par
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Legislative efforts concerning genetic privacy and discrimination are complicated by the difficulty of determining what constitutes "genetic information." Information with genetic significance includes not only the results of tests for genetic material but also many non-genetic medical tests and family medical history. The plethora of genetically significant data makes it difficult, if not impossible, to distinguish what information should be protected by genetic privacy and discrimination laws. \par\par

All statutory definitions of "genetic information," "genetic testing," or similar terms cover testing, or the results of testing, for genetic material. Beyond this basic category, the definitions vary substantially. Several states broaden the definition to include inherited characteristics "derived" from a family member.ⁿ²⁹ This phrase is apparently intended to extend "protection" to genetically significant aspects of family medical history. On the other hand, two states specifically exclude family medical history.ⁿ³⁰ and several states exclude routine tests such as blood and urine analysis done in the course of a physical examination, unless the tests were conducted specifically to identify a genetic anomaly.ⁿ³¹ Some states specify "direct measures" of genetic alterations and exclude "indirect manifestations" of such alterations.ⁿ³² About half the definitions include tests for gene products.ⁿ³³ A few states use different definitions in different contexts (for example, in the context of a prohibition on genetic discrimination in employment versus health insurance).ⁿ³⁴ \par

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n29. See, e.g., Cal. Health & Safety Code 1374.7(d) (West 1998); Cal. Ins. Code 10123.3(d) (West 1998) (covering genetic discrimination in health insurance, but see the narrower definition of "genetic characteristic" in California Insurance Code section 10147(b) for purposes of barring unfair (which is defined as not actuarially supported) genetic discrimination in life and disability insurance); 1997 Conn. Pub. Acts 95; 1997 Haw. Sess. Laws 91; N.J. Rev. Stat. 10:5-5(oo) (1997) (covering genetic discrimination in employment, but see the narrower definition of "genetic characteristic" in New Jersey Revised Statutes sections 17:48-6.18, 17:48A-6.11, 17:48E-15.2, 17B:26-3.2, 17B-27-36.2, and 26:2J-15.1 for the purposes of barring genetic discrimination in health coverage); 1997 N.C. Sess. Laws 350; Va. Code Ann. 38.2-508.4(A) (Michie 1997). \par\par
n30. See 1997 Fla. Laws ch. 182; 1997 Tenn. Pub. Acts 121. \par\par
n31. See 1997 Fla. Laws ch. 182; Ga. Code Ann. 33-54-2(1) (1997); 1997 Ill.

Pub. Act 90-25; Minn. Stat. 72A.139, subd. (2)(b) (1997); N.Y. Civ. Rights Law 79-1.1(a) (McKinney Supp. 1997); 1997 Tenn. Pub. Acts 121; 1997 Tex. Gen. Laws 1215. \par\par

n32. Colo. Rev. Stat. Ann. 10-3-1104.7(2)(b) (West 1998); Ind. Code Ann. 27-8-26-7 (Michie 1997); 1997 Kan. Sess. Laws 190; Ohio Rev. Code Ann. 1742.42(A), 3901.49(A)(1), 3901.50(A)(1) (Banks-Baldwin 1997). \par\par

n33. See 1997 Ariz. Sess. Laws 229; 1997 Conn. Pub. Acts 97-95; 1997 Haw. Sess. Laws 91; 1997 Ill. Pub. Act 90-25; Iowa Code Ann. 729.6.1.c (West 1997); 1997 La. Acts 1418; Minn. Stat. 72A.139, subd. (2)(b) (1997); N.J. Rev. Stat. 10:5-5.00 (1997) (covering genetic discrimination in employment, but the definitions used in the prohibitions of genetic discrimination in health coverage under New Jersey Revised Statutes sections 17:48-6.18, 17:48A-6.11, 17:48E-15.2, 17B:26-3.2, 17B-27-36.2, 26:2J-15.1 do not include gene products); N.Y. Civ. Rights Law 79-1.1(a) (McKinney Supp. 1997); 1997 N.C. Sess. Laws 350; R.I. Gen. Laws 28-6.7-2 (1997); Va. Code Ann. 38.2-508.4(A) (Michie 1997); Wis. Stat. 111.32, 942.07 (1996) (covering genetic discrimination in employment, but the definitions used in the prohibitions of genetic discrimination in health coverage under Wisconsin Statutes section 631.89 do not include gene products). \par\par

n34. California, New Jersey, and Wisconsin use different definitions in different contexts. See supra notes 29 & 33. \par\par

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Illustrating further the variety of possible definitions, the Maryland legislature considered a definition of "genetic test" that included gene products and inherited characteristics, but finally adopted a narrow definition limited to a "laboratory test of human chromosomes or DNA." n35 New Hampshire excludes a test "undertaken for the purpose of determining whether an individual meets reasonable functional standards for a specific job." n36 Louisiana includes "all information about genes, gene products, inherited characteristics, or family history/pedigree that is expressed in common language." n37 It is not clear what the Louisiana legislation intended by the last clause - perhaps a comment on scientific expression. \par

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n35. Md. Code Ann. Ins. 223.1 (1997). \par\par

n36. N.H. Rev. Stat. Ann. 141:H-1.IV (1996). \par\par

n37. 1997 La. Acts 1418 (relevant section codified at La. Rev. Stat. Ann. 213.7(A)(8) (West 1998)). \par

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This variety of definitions reflects the difficulty of determining what information should be protected. In a forthcoming article, Joseph S. Alper and Jon Beckwith note that most clinical tests detect abnormal concentrations of biochemical entities, which can provide information about the genes that code for those entities, as well as the functioning of various organs. n38 Thus, practically every clinical test may be considered a test for gene products. The determination whether a test is genetic may depend on the context or purpose of the test: for example, whether cholesterol is tested in an individual with a family history of hypercholesterolemia or as part of a routine physical. n39 A National Institute of Health task force on genetics and health insurance has noted that the categorization of health risk information as genetic or nongenetic is becoming

ng increasingly difficult, and most contents of medical records will soon have genetic significance. n40\par \par

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n38. Joseph S. Alper & Jon Beckwith, Distinguishing Genetic from Nongenetic Medical Tests: Some Implications for Antidiscrimination Legislation, Science and Engineering Ethics (forthcoming 1998). \par\par
n39. See id. \par\par
n40. NIH-DOE Working Group on Ethical, Legal and Social Implications of Human Genome Research, Genetic Information and Health Insurance: Report of the Task Force on Genetic Information and Insurance (1993) (available at <<http://www.nhgri.nih.gov/About/NHGRI/Der/Elsi/itf.html>>). \par \par

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Laws that limit the definition of genetic information to the results of direct tests for gene alterations are easier to implement but may not provide sufficiently broad protection. Employers and insurers in states where such laws are in effect know they cannot use the narrowly defined genetic tests to discriminate. But the laws do not prevent them from substituting indirect tests or family history to obtain information about genetic predisposition (albeit with less precision), and using such information as a basis for discrimination. The scope of protection against genetic discrimination is significantly expanded in the states with definitions that include gene products and family medical history as well as direct genetic test results. Such broad definitions may, however, be impractical to implement; George Annas, Leonard Glanz and Patricia Roche, for example, used a narrow definition of 'private genetic information' for their model Genetic Privacy Act, arguing that a broader definition would necessitate the overhaul of well established medical information practices and policies.' n41\par \par

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n41. George J. Annas, et al., The Genetic Privacy Act and Commentary, Boston: Health Law Department, Boston University School of Public Health (1995), at 48. \par \par

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B. The Meaning of Genetic Discrimination\par \par

It is important to note that whether genetic information is defined narrowly or broadly in the laws barring genetic discrimination, the term generally does not include information about expressed, or existing, genetic disorders. The quintessential feature of genetic discrimination is the use of genetic information about an asymptomatic person. If the disorder related to a genetic characteristic has occurred, discrimination based on the disorder may be unfair but is not customarily considered 'genetic discrimination.' \par\par

Some state laws specifically limit protection to asymptomatic individuals. For example, New York's law barring genetic discrimination in employment protects carriers of recessive traits and persons who have a genetic predisposition 'associated with an increased statistical risk of being expressed as a physical or mental disease or disability in the individual but which has not resulted

in any symptoms of such disease or disorder.⁴² The effect is the same if a law merely prohibits discrimination based on genetic information: an individual with a genetic disorder is protected from discriminatory use of genetic test results, but not from discrimination based on the presence of the disorder itself. Other laws, not specific to genetic discrimination, but instead protective of all persons with disabilities, may prohibit discrimination based on an existing genetic disorder. The laws that focus specifically on genetic discrimination are intended to protect only asymptomatic individuals.

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⁴² N.Y. Exec. Law 292, subd. 21-B (McKinney 1993 & Supp. 1997) (emphasis added).

-----End Footnotes-----

1. Utility of Genetic Discrimination Laws

This conception of genetic discrimination raises a question: why should special protection be provided to asymptomatic individuals who possess a gene associated with a disease? In the case of health insurance, why not protect all persons with indications of future illness, whether or not the indications are genetic, and persons whose need for health coverage is greatest - those who are sick? Unfortunately, universal health coverage is not yet politically feasible in this country, and we appear able to work toward it only incrementally. Indeed, the laws barring genetic discrimination in health insurance are a very slight increment, since they protect only the few persons who purchase individual health coverage. For the great majority of individuals, who are insured by employers or government plans, there is no individual underwriting and little threat of genetic discrimination in health insurance.

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⁴³ See Michael S. Yesley, Genetic Privacy, Discrimination and Social Policy: Challenges and Dilemmas, 2(1) Microbial & Comparative Genomics, 19, 26-27 (1997).

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The laws barring genetic discrimination in health insurance do not respond to a substantial problem but to a perceived threat of loss of insurance that might hinder genetic researchers' search for human subjects. Removing the basis for this fear of insurance loss may seem a reasonable step, but the possible cost of laws barring genetic discrimination in health insurance should also be weighed. Although the piecemeal approach of barring genetic discrimination may help a few people, it also removes a compelling argument for the ultimate goal of universal health coverage, which would benefit far more people.

2. Perverse Effects of Genetic Discrimination Laws

In the case of employment, absolute prohibitions of genetic discrimination ignore the possibility that under certain circumstances, such discrimination might be appropriate to protect the safety of workers or the public. A genetic anomaly might predict a disease that could endanger the public when it first manifests itself too quickly or subtly to detect in advance, or it might indicate a

usceptibility to an occupational exposure. \par\par

In the first situation, genetic discrimination should be the last resort. If routine physical examinations can detect manifestations of the disease before the public is endangered, there is no need for early exclusion from employment. However, if detection is not possible and the likelihood of harm to the public is significant, the genetic anomaly may be an appropriate disqualification for the position. \par\par

Discrimination should also be the last resort in the case of genetic susceptibility to an occupational exposure. The first effort should be to remove the exposure and make the workplace safe for everyone. But if that step is impossible, and the likely result of exposure is a serious, untreatable illness, exclusion of susceptible individuals may be justified. However, the laws barring genetic discrimination in employment generally do not permit any exceptions. \par\par

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IV. SHOULD THE LAW RECOGNIZE PROPERTY RIGHTS IN GENETIC DATA ABOUT INDIVIDUALS?

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We return to the question posed at the outset - should the law recognize a property right in genetic data about individuals? A few states have already taken this step.ⁿ⁴⁴ but its ramifications are uncertain. In opposing such legislation, the biotechnology industry is probably concerned that ownership of genetic data might permit the result that eluded John Moore: recovery of the value of the property (cells from his body) that was used without his permission. The California Supreme Court found Moore had a cause of action for the performance of medical procedures without informed consent, because his doctor did not disclose that he was using Moore's cells in research.ⁿ⁴⁵ But the court denied Moore's novel claim to own the biological materials^{\22} and accordingly refused to impose liability for conversion of the cells.ⁿ⁴⁶ In dissent, Justice Mosk noted that if Moore were found to have an ownership interest in the cells, his share in the profit from commercial exploitation of his cells might be substantial, but the remedy allowed by the court for lack of informed consent was^{\22} largely illusory.^{\22} ⁿ⁴⁷ Thus, the penalty for failure to obtain Moore's permission to use his cells in research would have been greater if the court had recognized an ownership interest in the cells.\par

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n44. See supra note 12. \par\par

n45. See *Moore v. Regents of the University of California*, 793 P.2d. 479, 486 (Cal. 1990), cert. denied, 499 U.S. 936 (1991).\par\par

n46. See *id.* at 487-97.\par\par

n47. See *id.* at 519 (Mosk, J. dissenting). \par

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The value of intangible genetic data about an individual is probably not comparable to the value of an individual's cells from which a commercial product is derived. A class of individuals might have an aggregate claim of significant value for conversion of their data used in product development, if the data were their property and had been used without permission, but this possibility is somewhat remote. Thus, the goal of protecting genetic information is not to preserve any value of the information, but to control its use and disclosure. For this purpose, requiring informed consent is probably sufficient, and the disinc

entive of potential recovery for conversion of property is unnecessary. Virtual ly the same informed consent will authorize use of genetic information, whether or not it is considered property. That consent will be granted or withheld on the basis of the individual's attitude toward the use and disclosure of the inf ormation, not the amount or lack of remuneration. \par\par

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V. CONCLUSION\par

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A property right might buttress the obligation of those conducting genetic tes ting to obtain informed consent, but that obligation has already become entrenc hed. The growing number of statutes requiring informed consent for the developm ent or disclosure of genetic information, the Moore court's reading of the comm on law requirement of informed consent, and, most recently, the Ninth Circuit's application of constitutional privacy protection to genetic testing make it im perative to obtain an individual's authorization of any genetic testing and use of identified test results. Overlaying an ownership interest would not add to this protection but might create uncertainty about the use of previously collec ted data, similar to issues surrounding the use of stored tissue samples. \par

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\qc Spring, 1999\par

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\qc 47 Buffalo L. Rev. 975\par

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LENGTH: 28810 words \par\par\pard

COMMENT: The Department of Defense DNA Repository: Practical Analysis of the Go vernment's Interest and the Potential for Genetic Discrimination \par\par\pard

Elizabeth Reiter+ \par\par\pard

+ J.D. candidate, May 1999, State University of New York at Buffalo; B.A., 19 93, St. Bonaventure University. This work is dedicated to the memory of my moth er, Kathleen Jermyn Reiter, who passed away on March 2, 1997 as a result of bre ast cancer. I sincerely hope that greater protections against genetic discrimin ation are implemented in the future so that individuals who have a history of g enetic disease within their family will not avoid genetic testing due to fear o f repercussions in the workplace. I wish to thank Lee Albert, Diane Avery, and David Filvaroff for providing guidance on this Comment. I also appreciate the e ndless support and encouragement provided to me by my father, sister, and frien ds throughout the course of working on this project. Finally, but for the sugge stion of Carolyn Fiume and No<um e>lle Kowalsky, I never would have been introd uced to the Department of Defense's mandatory DNA collection policy. \par\par\ pard

SUMMARY: ... The marines' objection to providing DNA samples was based on the f act that DNA contains information which could be used to predict whether an ind ividual is likely to develop a genetically-linked disease. ... Part IV discuss es the likelihood that a service member who provides DNA samples to the reposit ory will be subjected to genetic discrimination by future employers or by the m

ilitary itself. ... In order to determine whether genetic discrimination would be protected under this Act, one must determine whether the case law concerning asymptomatic HIV positive individuals will be applied to situations in which a n asymptomatic individual possesses a gene which increases his likelihood of de veloping a disease. ... In any event, no plaintiff who was a member of a prote cted class and brought a cause of action under Title VII for genetic discrimina tion on a disparate impact theory has ever been successful. ... Thus, no unifor med member of the armed forces could bring a claim against the military under Title VII for use of genetic information in a manner which disparately impacts individuals of a particular race, sex, religion, or national origin. ... Moreov er, when compared to the military's actual need to use the DNA it collects and stores for identification purposes, the actual necessity of the government to c ollect and store DNA sample of every service member may be even more speculativ e than the possibility of harm to service members. ... \par\par\pard

TEXT: \5B*975\5D \par\par

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Experience should teach us to be most on our guard to protect liberty when the government's purposes are beneficent. Men born to freedom are naturally alert to repel invasion of their liberty by evil-minded rulers. The greatest dangers to liberty lurk in insidious encroachment by men of zeal, well-meaning but wit hout understanding. \par\par

- Hon. Louis D. Brandeis n1\par

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\5B*976\5D \par

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I asked, what else will \5Bmy DNA\5D by used for, who else is going to have access to it, and how long are you going to keep it?... All the answers were \ '22We don't know.\'22\par

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n1. \i Olmstead v. United States, 277 U.S. 438, 479 (1927)\i0 (Brandeis, J. , dissenting). \par

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- John Christian Mayfield III n2\par

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n2. Dean Chadwin, The DNA War: How Two Marines Fought the Military's Genetic Roundup, The Village Voice (New York, N.Y.), May 14, 1996, at 23. John Mayfiel d was describing the events which took place before he and a fellow service mem ber disobeyed a lawful written order demanding that they provide samples of the ir DNA for the Department of Defense DNA Repository. Id. \par

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Introduction\par

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John Christian Mayfield and Joseph Vlacovsky became what some have referred to

as the 'first DNA conscientious objectors' when they refused to surrender DNA samples to the military on January 24, 1995. On that date, Lance Cpl. Mayfield and Cpl. Vlacovsky reported to their battalion's aid station to undergo what they thought would be a standard physical examination in preparation for an upcoming eleven month deployment. However, the workers at the clinic presented the marines with an unexpected new request - that they provide blood and saliva samples for DNA testing. Mayfield and Vlacovsky were hesitant. When they inquired as to how these specimens were going to be used, none of the technicians knew the answer. The two marines left without providing the requested samples.

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n3. Id. \par\par

n4. See id. \par\par

n5. See id. at 23; Robert Craig Scherer, Mandatory Genetic Dogtags and the Fourth Amendment: The Need for a New Post-Skinner Test, 85 Georgetown L.J. 2007 (1997).\i0 \par\par

n6. See Chadwin, supra note 2, at 23. \par\par

n7. See id.; Scherer, supra note 5, at 2007. \par\par

n8. See Chadwin, supra note 2, at 23. \par

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Mayfield and Vlacovsky were unaware that in 1991 the United States Department of Defense (DoD) had established a policy of mandatory DNA collection from all service members for the purpose of identifying the remains of service members. The DoD implemented this program by collecting DNA specimens from military personnel who, like Mayfield and Vlacovsky, were preparing for operational deployment, as well as those personnel enlisting or reenlisting in the armed forces. Mayfield and Vlacovsky refused to provide their DNA samples to the military because they were concerned that someone could access the information and use such information for adverse purposes. The marines were punished for disobeying a lawful written order of a commanding officer. Subsequently, they brought a civil suit in the District Court of Hawaii to challenge the military's mandatory DNA collection policy, and appealed to the Ninth Circuit when the district court decided in favor of the government.

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n9. \i Mayfield v. Dalton, 901 F. Supp. 300, 302 (D. Haw. 1995), \i0 vacated, \i 109 F.3d 1423 (9th Cir. 1997).\i0 \par\par

n10. See \i id. at 304.\i0 \par\par

n11. See id. \par\par

n12. See Sarah Gill, The Military's DNA Registry: An Analysis of Current Law and a Proposal for Safeguards, \i 44 Naval L. Rev. 179, 190-91 (1997).\i0 \par\par

n13. See \i Mayfield, 901 F. Supp. at 300;\i0 Gregory L. Simmons, Compulsory DNA Sampling of Service Members for Inclusion in the DoD DNA Registry: Remains Identification with a Risk 31 (1996). \par\par

n14. See \i Mayfield v. Dalton, 109 F.3d 1423 (9th Cir. 1997).\i0 \par

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The marines' objection to providing DNA samples was based on the fact that DNA contains information which could be used to predict whether an individual is likely to develop a genetically-linked disease. n15 Such information is accessible due in large part to the Human Genome Project, an international project with the ultimate goal of identifying all of the three billion bases in the human genome by 2005. n16 The project is of enormous scope, considering that every individual's DNA sequence contains as much information as one thousand thousand -page phone books. n17 However, some have predicted that, when completed, the project will provide 'the ultimate tool for understanding ourselves at the molecular level,' n18 and that, as a result, it will be 'the first time in 10,000 years of civilization that humans have had the capacity to upgrade their quality of life.' n19\par

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n15. See generally John Carey et al., *The Biotech Century*, Business Week, Mar. 10, 1997, at 78. \par\par

n16. See *Advances in Genetics Research and Technologies: Challenges for Public Policy: Hearings Before the Senate Committee on Labor and Human Resources*, 104th Cong. 46 (1996) (testimony of Francis S. Collins, M.D.). \par\par

n17. See Walter Gilbert, *A Vision of the Grail*, in *The Code of Codes: Scientific and Social Issues in the Human Genome Project* 84 (Daniel J. Kevles & Leroy Hood, eds. 1992). \par\par

n18. L. Jaroff, *The Gene Hunt*, Time, Mar. 20, 1989, at 63. \par\par

n19. George J. Annas & Sherman Elias, *Gene Mapping: Using Law and Ethics as Guides* 47 (1992). \par

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As genetic structure is explored, individuals gain the ability to read the human genome, note genetic defects or discrepancies, and predict who is likely to develop genetically-linked disease. n20 Individuals who are likely to develop certain diseases can take preventative measures that will minimize environmental factors which could promote the onset of disease. n21 In addition, scientists are exploring 'gene therapy,' a new treatment which may permanently prevent the onset of genetically-linked diseases. n22\par

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n20. See generally Carey et al., *supra* note 15, at 78. \par\par

n21. Francis S. Collins et al., *Variations on a Theme: Cataloging Human DNA Sequence Variation*, Science, Nov. 28, 1997, at 34; Clive Cookson & Daniel Green, *Genetic Research Gathers Steam: The Study of DNA Structure and the Process of Changing Mutated Genes is no Longer the Stuff of Science Fiction*, Fin. Post, Nov. 5, 1997, at A5. \par\par

n22. Mark D. Somerson, *Effective Gene Therapy Doesn't Come Instantly*, Columbus Dispatch (Ohio), Feb. 8, 1998, at 7B. \par

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Although the Human Genome Project offers many benefits, the technology involved also creates new opportunities for abuse or discrimination. Many individuals fear that they could be denied health insurance, life insurance, or employment

t because of unfavorable results on a genetic test. n23 Since few legal remedies against genetic discrimination exist, these fears may be justified.

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n23. See Rick Weiss, Clinton to Support Legislation Guarding Against Gene-Test Bias; Inherited Risk for Disease Has Kept Some from Getting Insurance, Wash. Post, July 14, 1997, at A8; Robin Marantz Henig, Tricky Truths about Ethnicity and Genetics, Wash. Post, Oct. 5, 1997, at C01; see also infra notes 167-88 (discussing examples of genetic discrimination in the workplace).

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This Comment explores the DoD's mandatory DNA collection policy in an effort to determine whether the government needed to implement such a policy and whether the marines' fears of genetic discrimination were reasonable. Part I examines the scientific process of DNA testing and describes the information that may be obtained through this testing. Part II discusses the Department of Defense DNA Repository and the case which arose when John Mayfield and Joseph Vlacovsky refused provide samples for the DNA Repository. Specifically, Part II scrutinizes the district court's determination that the government's interest in the identification of human remains was more compelling than the marines' privacy interest in their DNA. Part III analyzes the extent of the government's interest in maintaining a DNA Repository, concluding that the government's interests in perpetuating its DNA collection policy are not compelling. Part IV discusses the likelihood that a service member who provides DNA samples to the repository will be subjected to genetic discrimination by future employers or by the military itself. This Comment concludes that the government's interest in collecting and storing the DNA of all of its service members is not as compelling as portrayed by the government in for the following reasons: (1) during peacetime, the chance that any service member must be identified is extremely low; (2) based upon the U.S. military's experience identifying the remains of 388 service members during the Gulf War, the military's need to identify bodily remains during hostile conflicts through the use of DNA analysis is very low; (3) DNA identification of remains during hostile conflicts is not a foolproof method of identification due to the unpredictable environmental conditions on a battlefield; and (4) DNA identification may be undertaken without the convenience of a DNA Repository by using DNA donated by the family members of unidentified service members. This Comment concludes that the U.S. military has the power and the right to use the information in the DNA Repository to engage in genetic discrimination against its own service members, provided that such action is deemed a military necessity. Furthermore, this same potential for genetic discrimination could exist in the private sector in any one of the thirty-six states which have no laws preventing genetic discrimination if the DoD stores this genetic information electronically. Unless these potential problems are addressed, the DOD will be allowed to maintain a policy which could potentially expose any number of service members to genetic discrimination.

I. DNA Testing

A. The Science of DNA Testing

With the exception of red blood cells, every single cell in the human body contains deoxyribonucleic acid (DNA) in its nucleus. n24 DNA is a six-foot long strand of chemical subunits which encodes information concerning cell structure and function. n25 Essentially, the genetic information contains

ined within every cell of the human body is identical, n26 and any single strand of DNA may provide a 'complete genetic blueprint' for all of an individual's physical traits. n27 DNA is a static material which will typically not change or grow throughout the course of a person's life. n28

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n24. See Sally E. Renskers, Comment, Trial By Certainty: Implications of Genetic DNA Fingerprints, 39 Emory L.J. 309, 311 (1990); Janet C. Hoeffel, Note, The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant, 42 Stan. L. Rev. 465, 469 (1990).

n25. See Dan L. Burk & Jennifer A. Hess, Genetic Privacy: Constitutional Considerations in Forensic DNA Testing, 5 Geo. Mason U. Civ. Rts. L.J. 1, 3 (1995); Hoeffel, supra note 24, at 469.

n26. See Hoeffel, supra note 24, at 470.

n27. Burk & Hess, supra note 25, at 4.

n28. See Hoeffel, supra note 24, at 470. Although DNA itself is typically static, it may be altered or be caused to mutate by exposure to certain adverse conditions. See infra notes 125-36 and accompanying text.

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A DNA strand resembles a double helix. n29 Along the length of the DNA strand, molecules called nucleotide bases pair up with one another. n30 These nucleotide bases are organized into coding regions, or genes, n31 which consist simply of assorted nucleotide base pair sequences. n32 Each gene holds the genetic code for one particular feature, structure, or function of the human body. n33

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n29. See Renskers, supra note 24, at 312.

n30. See id.; Hoeffel, supra note 24, at 470.

n31. See David T. Suzuki et al., An Introduction to Genetic Analysis 578 (3d ed. 1986).

n32. See Hoeffel, supra note 24, at 470.

n33. See id.

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Out of the approximately three billion base pairs in each DNA molecule, an estimated three million pairs - known as polymorphisms - are truly unique to an individual. n34 In order to identify a person on the basis of his or her DNA, DNA profiling techniques focus on highly polymorphic sections of DNA. n35

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n34. See id. Biologically, human beings are very similar in organic structure. For example humans have two arms and two legs, but only one nose. As one might therefore expect, more human genes are similar than different. See id.; see also FBI DNA Fingerprinting: Hearing Before the Subcomm. on Civil and Constitutional Rights of the House Comm. on the Judiciary, 101st Cong. 2 (1989).

n35. See Alec. J. Jeffreys et al., Hypervariable 'Minisatellite' Regions

ns in Human DNA, 314 Nature 67 (1985). \par

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The two most well-known tests used for the purposes of DNA identification are RFLP analysis ('restriction fragment length polymorphism' analysis) and PCR analysis ('polymerase chain reaction' analysis). RFLP analysis involves breaking down the DNA into fragments, hypervariable minisatellite regions, which consist solely of polymorphisms.ⁿ³⁶ These fragments are then sorted by size to reveal a RFLP banding pattern which is highly characteristic of an individual.ⁿ³⁷\par

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ⁿ³⁶. See Renskers, *supra* note 24, at 312; Hoeffel, *supra* note 24, at 472; Jeffreys et al., *supra* note 35. \par\par

ⁿ³⁷. See Burk & Hess, *supra* note 25, at 4-6. \par

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On the other hand, PCR analysis uses a radioactive DNA probe to examine sections of DNA and search for a particular sequence of nucleotides.ⁿ³⁸ This test does not separate the DNA strand into segments, as the RFLP test does.ⁿ³⁹ Instead, the test searches the DNA strand for a particular sequence at the probe position.ⁿ⁴⁰ In order to search more thoroughly for the sequence in question, the probe checks for the sequence in various sections of the DNA strand.ⁿ⁴¹ Despite efforts to increase reliability of the PCR testing, the test is still somewhat less reliable than RFLP analysis, since the chances of a coincidental match are higher.ⁿ⁴² One advantage of PCR testing lies in the fact that it may be applied to a small amount of DNA or DNA that is in a degraded form.ⁿ⁴³\par

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ⁿ³⁸. See *id.* \par\par

ⁿ³⁹. See *id.* \par\par

ⁿ⁴⁰. See *id.* \par\par

ⁿ⁴¹. See *id.* \par\par

ⁿ⁴². See Legis. Comm'n on Sci. and Tech., Forensic DNA Analysis, LCST Report No. 90-1, at 6 (N.Y. 1990) ('hereinafter Comm'n of 1990'). \par\par

ⁿ⁴³. See Comm'n of 1990, *supra* note 42, at 6. See also Burk & Hess, *supra* note 25, at 6. \par

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B. The Human Genome Project\par

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The Human Genome Project (HGP) is an international project launched in 1991 with the purpose of analyzing the molecular structure of human chromosomes.ⁿ⁴⁴ This purpose is carried out through gene identification, mapping,ⁿ⁴⁵ and 'sequencing'.ⁿ⁴⁶ The project's organizers divided the project into three segments. First, scientists are creating a detailed physical map for the human genome by dividing DNA into smaller fragments.ⁿ⁴⁷ Scientists hope to use the physical map to identify patterns of heredity among humans as well as sites on the DNA strand connected to disease.ⁿ⁴⁸ When completed, this map will serve

as a source for pinpointing the location of genes related to various diseases.
n49 Second, project participants seek to determine the sequence of all nucleotide base pairs in every chromosome. n50 Scientists are striving to sequence all of the DNA in the human genome by 2005. n51 The final leg of the project, fully understanding all of the genes, shall keep researchers in the field of biogenetics busy for many years to come. n52\par

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n44. See Legis. Comm'n on Sci. and Tech., DNA-Based Tests: Policy Implications for New York State, LCST Report No. 94-1, at 5 (N.Y. 1994) \5Bhereinafter Comm'n of 1994\5D; Preventing Genetic Discrimination in Health Insurance: Hearings Before the House Commerce Committee Task Force on Health Records and Genetic Privacy, 105th Cong. 53 (1997) \5Bhereinafter Preventing Genetic Discrimination\5D. \par\par

n45. Gene mapping is the process of pinpointing the location of a gene on a chromosome. See Comm'n of 1994, supra note 44, at 6. \par\par

n46. Sequencing involves determining the order of the nucleotide bases on a DNA strand. See id. \par\par

n47. See Gilbert, supra note 17, at 85. \par\par

n48. See id. \par\par

n49. See id. Genes related to disease have already been discovered. For example, in 1994, scientists discovered BRCA1, a gene related to the development of breast cancer. See Nicholas Wade, Scientists Discover Role of 2 Genes in Breast Cancer, Patriot Ledger (Quincy, Mass.), Apr. 24, 1997, at A4. In 1995, an additional breast cancer gene was found, BRCA2. People who have a flawed copy of either gene can have a greater than eighty-five percent chance of developing breast cancer. See id. More recently, in August of 1997, scientists at the National Institutes of Health announced that they had found another gene related to breast cancer, AIB1. See Breast Cancer: Scientists Discover Gene Linked to Growth of Disease, Chi. Trib., Aug. 18, 1997, at A12. \par\par

n50. See Gilbert, supra note 17, at 85. \par\par

n51. See Preventing Genetic Discrimination, supra note 44; Joyce Lain Kennedy, Genetic Testing in the Workplace Holds Potential for Discrimination, Buff. News, Aug. 23, 1997, at A13. \par\par

n52. See Gilbert, supra note 17, at 85. \par

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In the United States alone, Congress appropriated the HGP three billion dollars through the year 2006. n53 The fact that such a large sum was assigned to this project emphasizes the importance placed on the project's anticipated results - insights into many diseases which have genetic indicators. n54 Once the order of the three billion human DNA bases has been revealed, scientists will begin to unlock how the nucleotide bases function and interact with one another. n55 They hope to catalog sets of genes that \5B*983\5D generally affect how the body grows or fails to function. n56 It is expected that new technologies will allow scientists to reveal the secrets of disease susceptibility n57 by determining which genes are related to heart disease, cancer susceptibility, high blood pressure, schizophrenia, Alzheimer's disease susceptibility, and manic-depressive illness, among many other conditions. n58 After disease-linked genes are detected, scientists will develop DNA-based analysis to identify people who possess these genes and scientists will concentrate on developing treatments to target such diseases. n59\par

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n53. See Comm'n of 1994, supra note 44, at 6. \par\par

n54. See id. \par\par

n55. See id. \par\par

n56. See id. \par\par

n57. See id. \par\par

n58. See id. New genes associated with disease are discovered weekly. At present there are genetic tests to identify approximately 450 genetic disorders. More of these tests are expected to be developed in the future. See Preventing Genetic Discrimination, supra note 44. \par\par

n59. See Gilbert, supra note 17, at 95. \par

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Furthermore, some researchers hope that the results of the HGP will allow humans to arrive at a new level of understanding about themselves and how their bodies function. Walter Gilbert, a scientist who decoded one of the first DNA regions in 1971, aptly expressed this idea: \par\par

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We will understand deeply how we are assembled, dictated by our genetic information. Part of that understanding is, of course, to realize that genetic information does not dictate everything about us. We are not slaves of that information.... But society will have to wrestle with the question of how much of our makeup is dictated by the environment, and how much is dictated by our genetics, and how much is dictated by our own will and determination. n60\par

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n60. Gilbert, supra note 17, at 96. \par

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II. Establishment of and Objection to the Department of Defense DNA Repository\par

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In 1991, the DoD began using DNA testing to identify soldiers' remains in cases where traditional identification sources such as fingerprints or dental records would be inadequate. n61 The DoD claimed that this program would remedy DNA identification problems it experienced during \5B*984\5D the Gulf War. n62

By December 1991, the DoD established a program to collect DNA samples from every service member on active duty or in the reserve armed forces and store them in the DoD DNA Repository. n63 By November 1996, the Repository contained more than one million specimens. n64 The DoD anticipates that the DNA Repository will contain the specimens of all military personnel by 2001, n65 indicating that the DoD will collect more than 2.5 million additional specimens. n66\par

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n61. See *Mayfield v. Dalton*, 901 F. Supp. 300, 302 (D. Haw. 1995), *vacated*

cated, 109 F.3d 1423 (9th Cir. 1997).

n62. See id.

n63. See id.

n64. See No Secrets Anymore, The Indianapolis Star, Nov. 1, 1996, at A3.

n65. See Mayfield, 901 F. Supp. at 302.

n66. See Simmons, supra note 13, at 35. This estimate was based on the fact that approximately 2.5 million individuals are in the military each year and assumes that the turnover rate in the military is 200,000 to 300,000 per year. Id.

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At present, the DoD gathers blood and cheek cell samples from every service member and stores them for fifty years at the Repository in Gaithersburg, Maryland. n67 Blood samples are smeared on a card and vacuum-sealed. n68 Cheek cell samples are collected on a cotton swab and soaked in alcohol. n69 After assigning an identification number and bar code to the samples, the DoD stores all of the samples in refrigerated containers. n70 If a service member completes his or her military service before the expiration of the fifty year storage period, the service member may request that the DoD destroy the samples. n71

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n67. See Mayfield, 901 F. Supp. at 302; Mayfield v. Dalton, 109 F.

3d 1423, 1426 n.1 (9th Cir. 1997); see also Scott Winokur, Genetic Discrimination: Your DNA Can Hurt You in More Ways Than One, Denv. Rocky Mtn. News, June 30, 1996, at C4; Stephen Goode, Marines Stand Ground Against DNA Testing, Insight Mag., Feb. 19, 1996, at 38.

n68. See Mayfield, 901 F. Supp. at 302.

n69. See id.

n70. See id.; Mayfield, 109 F.3d at 1426 n.1; see also Winokur, supra note 67, at C4; Goode, supra note 67, at 14.

n71. See Mayfield, 109 F.3d at 1426 n.1. The specimen is destroyed within 180 days of a service member's request. Id.

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In January 1995, Lance Cpl. John C. Mayfield III and Cpl. Joseph Vlacovsky, marines stationed at the Kaneohe Bay Marine Corps Air Station in Hawaii, were scheduled to deploy. n72 When ordered to provide blood and cheek samples for the DoD DNA Repository, both marines refused on the grounds that the DoD had not implemented adequate measures to prevent adverse use of any information contained in their DNA samples. n73 The Marine Corps charged Mayfield and Vlacovsky with disobeying a lawful written order from a commanding officer n74 and threatened them with courts martial, prison sentences, and bad-conduct discharges. n75

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n72. See Mayfield, 901 F. Supp. at 302.

n73. Id.; See Goode, supra note 67, at 14.

n74. See Gill, supra note 12, at 190.

n75. See Goode, supra note 67, at 14.

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Mayfield and Vlacovsky commenced a civil action, *Mayfield v. Dalton*, n76 to challenge the military's collection policy. They argued, among other things, that the military's collection and storage of DNA specimens violated their Fourth Amendment protection against unreasonable searches and seizures. n77 To determine whether DNA collection, concededly a seizure, was unreasonable, the court applied the Skinner balancing test, a standard commonly relied upon in mandatory drug testing cases. n78 Under Skinner, the court weighs the government's interest in the disputed activity against the privacy interests of the individuals being affected to ascertain which party has the greater interest. n79\par

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n76. *Id.* 901 F. Supp. 300 (D. Haw. 1995), *vacated*, *id.* 109 F.3d 1423 (9th Cir. 1997).\i0 \par\par

n77. Because the marines relied primarily on Fourth Amendment arguments at the district court proceeding, the district court did not respond to the allegations of other constitutional violations which had been raised. See *id.* at 303.\i0 \par\par

n78. *Id.* at 303-04 (citing *Skinner v. Railway Labor Executives Ass'n*, 489 U.S. 602 (1989)); see also *Schmerber v. California*, 384 U.S. 757 (1966).\i0 \par\par

n79. See *Skinner*, 489 U.S. at 628.\i0 \par

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The district court granted the Marine Corps' motion for summary judgment, n80 holding that military collection of DNA samples, a 'seizure' within the meaning of the Fourth Amendment, was not 'unreasonable.' n81 The court stated that the government's interest in collecting DNA samples was the identification of remains. n82 In addition, the court imputed the interest of service members' next of kin to the government's side of the equation, emphasizing that family members would 'derive great benefit, and solace, from the speedy and definite identification of the remains of their loved ones.' n83 The court stated 'the military has demonstrated a compelling interest in both its need to account internally for the fate of its service members and in ensuring the peace of mind of their next of kin and dependents in time of war.' n84\par

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n80. See *id.* 901 F. Supp. at 306.\i0 \par\par

n81. *Id.* at 303 (citing *Schmerber*, 384 U.S. at 757).\i0 \par\par

n82. See *id.* \par\par

n83. *Id.* at 303-04. \par\par

n84. *Id.* \par

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Regarding the marines' privacy rights, the court concluded that collection of DNA samples was a minimal intrusion. n85 It focused upon the purpose for which

h the sample was collected - remains identification - and observed that tissue collection for remains identification was 'far less intrusive' than the collection of bodily fluids for use in a criminal prosecution or to detect illegal drug or alcohol use. n86 The court suggested that, although criminal prosecution or drug testing might limit personal freedom by imprisonment, DNA identification of human remains serves the positive goal of accounting for the fates of service members. n87 Finally, the court noted that even if the privacy rights of a civilian would have been violated by a compulsory DNA collection program, the DoD did not violate Mayfield's and Vlacovsky's privacy rights since the two men had forfeited some of their freedom by enlisting in the Marine Corps. n88

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n85. See id. \par\par

n86. Id. at 303; see also *Skinner v. Railway Labor Executives Ass'n*, 489 U.S. 602, 604 (1989); *Nat'l Treasury Employees Union v. Von Raab*, 489 U.S. 656; *Schmerber v. California*, 384 U.S. 757 (1966). \par\par

n87. See *Mayfield*, 901 F. Supp. at 304. \par\par

n88. Id. ('Certain public employees are necessarily subject to diminished expectations of privacy... and 'may not only be required to give what in other contexts might be viewed as extraordinary assurances of trustworthiness and probity, but also may expect intrusive inquiries into their physical fitness or those special positions.' (citing *Von Raab*, 489 U.S. at 671)). \par

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Having adopted the Skinner test and weighed the government's interests against that of the marines, the district court found in favor of the government: \par\par

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The court finds that the military has demonstrated a compelling interest in both its need to account internally for the fate of its service members and in ensuring the peace of mind of their next of kin and dependents in time of war. The court further finds that when measured against this interest, the minimal intrusion presented by the taking of blood samples and oral swabs for the military's DNA registry, though undoubtedly a 'seizure,' is not an unreasonable seizure and is thus not prohibited by the '5B*987'5D Constitution. n89\par

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The district court refused to consider additional arguments offered by the marines that the potential future use of the DNA samples by the military for a purpose other than the identification of remains would constitute a much greater privacy intrusion. n90 In particular, Mayfield and Vlacovsky feared that the samples could be used to diagnose genetically-linked diseases and disorders or could be accessed by third parties such as potential employers or insurance agencies. n91 The district court decided that such arguments did not present a justiciable case or controversy since no such action had actually been taken by the military. It concluded that the marines' arguments were based on a purely hypothetical situation. n92\par

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n89. \i Mayfield, 901 F. Supp. at 304.\i0 \par\par
n90. See id. \par\par
n91. See id. \par\par
n92. See id. (citing \i Fern v. Turman, 736 F.2d 1367 (9th Cir. 1984),\i0 c
ert. denied, \i 469 U.S. 1210 (1985)).\i0 \par
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Mayfield and Vlacovsky appealed to the Ninth Circuit. n93 However, the two m
arines were discharged from the Marine Corps prior to oral argument, and they n
ever provided any samples to the DoD DNA Registry. n94 Accordingly, the circuit
court held that the marines' Fourth Amendment arguments were moot. n95 Mayfiel
d and Vlacovsky argued that there was still a potential that they would be subj
ected to the military's DNA sample regulations since, as members of the Marine
Corps Reserves, they could be required to return to active duty at some future
point. n96 However, the Ninth Circuit rejected this argument. Although there wa
s a possibility that the pair would be recalled to active duty, the court decla
red that recall only would happen \22at some indefinite time in the future and
then only upon the occurrence of future events now unforeseeable.\22 n97 Thes
e conditions were \22speculative contingencies\22 upon which the court was no
t willing to base its decision. n98 The Ninth Circuit held that no exception to
the mootness doctrine could be applied because the marines suffered no \22har
m \5B*988\5D \22capable of repetition, yet evading review.\22 n99\par
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n93. See \i Mayfield v. Dalton, 109 F.3d 1423 (9th Cir. 1997).\i0 \par\par

n94. See \i id. at 1425.\i0 \par\par
n95. See id. \par\par
n96. See id. \par\par
n97. \i Id. at 1425.\i0 \par\par
n98. Id. (quoting \i Preiser v. Newkirk, 422 U.S. 395, 403 (1975)).\i0 \pa
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n99. Id. at 1426 (quoting \i Southern Pacific Terminal Co. v. ICC, 219 U.S.
498 (1911)).\i0 \par
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Finally, the Ninth Circuit concluded that Mayfield and Vlacovsky's arguments
regarding harm which might befall them in the future were not yet ripe for rev
iew. n100 The court vacated the judgment of the district court and remanded the
case with instructions to dismiss it as moot. n101\par
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n100. See id. at 1425. \par\par
n101. See id. at 1427. \par
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III. Identification of Remains and Ensuring the Peace of Mind of Next of Kin
as \22Compelling\22 Government Interests\par

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When the court in Mayfield analyzed the military's interests regarding the need to account for the fate of service members and the assurance of peace of mind for next of kin, the military's interests were deemed 'compelling.'¹⁰² The identification of remains is an admittedly benign activity in which the military must engage, an activity which Mayfield and Vlacovsky did not challenge.¹⁰³ Rather, they objected to the compulsory element of the DoD's DNA collection for remains identification.¹⁰⁴ Instead of focusing upon whether the government has a compelling interest in remains identification in general, the focus should be upon whether the identification of human remains through the mandatory collection and storage of millions of DNA samples is an activity in which the government has a compelling interest. Investigation of this issue reveals that the DoD's interest is not nearly as compelling as it was portrayed in Mayfield.

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¹⁰². *Mayfield*, 901 F. Supp. at 304.

¹⁰³. See *id.* The ability of the military to identify the remains of service members affects whether numerous benefits, such as group life insurance, veteran's benefits, burial benefits, and survivor's benefits should be paid. See Gilman, *supra* note 12, at 183.

¹⁰⁴. See *Mayfield*, 901 F. Supp. at 304.

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A. Absence of Conflict

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The past twenty years have been relatively peaceful from a military standpoint, and few service members have died in combat. From 1979 through September 1996, 558 service members died in hostile engagements, approximately thirty-five lives lost each year.¹⁰⁵ Considering that the average military personnel strength per year was 1,965,181, the number of yearly deaths on average from combat per 100,000 persons equaled 1.78.¹⁰⁶ Thus, based on these numbers, though any life lost is one too many, the chance that a service member will be killed in combat during a time of peace is approximately 1 in 50,000, or 0.002%.

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¹⁰⁵. See Department of Defense, Worldwide U.S. Active Duty Military Personnel Casualties, October 1979 through September 1996, at 7 (1997) (hereinafter *Military Personnel Casualties*). At the time when this comment was written, information for subsequent years was, as yet, unavailable.

¹⁰⁶. See *id.* at 1.

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When analyzing the likelihood that Mayfield and Vlacovsky would be involved in a future conflict, the Ninth Circuit recognized that the chance of conflict was low: 'While there is a possibility that a national emergency might arise, and that the military might choose to recall Mayfield and Vlacovsky to active duty, the recall could happen only at some indefinite time in the future and then only upon the occurrence of future events now unforeseeable.'

The court described the potential of future conflict as a speculative contingency and disregarded the marines' contention that harm could befall them in the future. n108 However, considering the fact that each individual has only a 0.002 % chance of dying if military conditions remain constant, is not the military's need to compel all soldiers to provide DNA samples for identifying remains likewise a speculative contingency? The minimal chance of casualty from military conflict during peaceful periods does not demonstrate that mandatory DNA collection is a compelling governmental interest.\par

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n107. *Mayfield v. Dalton*, 109 F.3d 1423, 1425.\i0 \par\par

n108. See *id.* \par

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However, the military's interest would become more compelling if a conflict arose or if the potentiality of involvement in a hostile situation became a strong probability, since the chances of a service member persisting in a combat situation would increase. However, this increased risk would only pertain to individuals involved in the conflict, and would not support the universal mandatory policy currently employed by the military. Instead, if a compelling governmental interest \5B*990\5D arose due to a military conflict, then the government could reasonably require service members exposed to the high-risk environments to supply a DNA sample. \par\par

The military might try to buttress its argument that mandatory DNA collection is compelling by taking into account deaths suffered in non-combat conditions because such non-combat deaths constitute an estimated ninety-eight percent of military deaths per year. n109 From 1979 to 1996, the military lost 29,903 service members due to conditions such as accidents, illnesses, homicides, and self-inflicted injuries. n110 The military could argue that such numbers render remains identification more compelling.\par

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n109. See *Military Personnel Casualties*, *supra* note 105, at 7. \par\par

n110. See *id.* \par

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However, when considering non-combat casualties, deaths resulting from illness or self-inflicted violence should be excluded from the analysis since the identification of remains is not ordinarily problematic in such circumstances. Discussion should instead be limited to the 19,754 deaths resulting from homicides or accidents, an average of 1162 casualties per year or 59 deaths per 100,000 service members. n111 As such, the chance of death by accident or homicide during peacetime is 0.05%, one-half of one percent. Although this percentage is considerably greater than that for casualties in hostile situations, one-half of one percent may still not give rise to a compelling governmental interest.\par

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n111. See *id.* \par

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This information raises some interesting questions. If the military's interest in identifying the remains of individuals killed in accidents and homicides, based on the number of deaths in these respective categories, is actually more compelling than identifying the remains of soldiers killed in battle, how would the military's interest differ from the interests of the population as a whole? Does the government have a compelling interest in identifying the remains of all civilians murdered or killed in accidents? Should the government be allowed to seize the DNA of all citizens based on the fact that any citizen might, at some time, die in an accident or at the hands of a murderer? Are murders and accidents not 'speculative contingencies'? \par\par

Identification of remains of soldiers killed in accidents or due to homicide is not a purpose which the government articulated in Mayfield. The military's interests established a mandatory DNA collection program to have a 'means of identifying... remains should soldiers be killed in a collision with the Marine Corps' and to be 'able to confirm which of its members have fallen in battle, and which ones may have been taken prisoner or are otherwise unaccounted for.' n112 The military focused on identifying remains 'in time of war,' n113 not in time of peace.\par

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n112. \i Mayfield v. Dalton, 901 F. Supp. 300, 303-04 (D. Haw. 1995), \i0 vacated, \i 109 F.3d 1423 (9th Cir. 1997).\i0 \par\par

n113. \i Id. at 304.\i0 \par

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In conclusion, collection of DNA from all active duty, reserve, and National Guard component personnel is a vast undertaking, especially when one considers the number of individuals who fall within these categories. n114 When one compares the number of individuals who comprise this class in any given year to the number of individuals who might possibly need to be identified during times of peace, the disparity between these numbers suggests that the government's need to collect and store the DNA of every service member is not as compelling as has been suggested.\par

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n114. In the 1992 fiscal year, the authorized combined services active duty personnel strengths equaled 1,886,400. Simmons, supra note 13, at 17. In that same year, the number of authorized reserves was 1,151,046. Id. In 1995, the number of authorized active duty personnel strengths was 1,525,692, while authorized reserves equaled 989,247. See id. \par

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B. Continued Necessity of Traditional Means of Remains Identification\par

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DNA analysis provides the military with 'a means of identifying remains too badly damaged for identification through dental records or fingerprints.' n115 Yet, of the estimated 0.002% of service members expected to perish in hosti

le situations each year during relatively peaceful times, n116 not every set of remains requires DNA analysis to establish positive identification. Although the destructive effects of modern weapons upon the human body might have raised doubts concerning the continued usefulness of traditional methods of remains identification such as fingerprinting, dental radiographs, serological analysis, \5B*992\5D medical records, or visual inspection, n117 traditional methods of remains identification do continue to provide an accurate method for identification in most cases. In fact, of the 388 deaths which resulted from Operations Desert Shield and Desert Storm, n118 only two cases required DNA analysis in order to complete remains identification - approximately 0.0052%. n119 In the other 386 cases, conventional methods of remains identification were sufficient. n120 Fingerprint analysis alone allowed positive identification in 13% of these cases, while dental records alone provided 18% of the positive identifications. n121 Using a combination of fingerprint analysis and dental records identified another 63% of the remains. n122 The final 6% of the identifications were carried out by using \22other\22 methods, which included visual identification and the use of information taken from medical records. n123 Thus, traditional methods of remains identification are still useful to the military for successful identification of remains and led to the positive identification in an overwhelming majority of cases from Operations Desert Shield and Desert Storm, 99.9948%.\par

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n115. \i Mayfield, 901 F. Supp. at 302.\i0 \par\par
n116. See supra notes 105-06 and accompanying text. \par\par
n117. See Simmons, supra note 13, at 29. \par\par
n118. See id. at 18. Of these deaths, 376 occurred during the conflict, and twelve additional deaths took place after the cease-fire on April 11, 1991. Id. \par\par
n119. See id. \par\par
n120. See id. \par\par
n121. See id. at 34. \par\par
n122. See id. \par\par
n123. See id. The two cases in which DNA analysis aided identification were included within this \22other\22 category. Id. \par
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If in peaceful times an average of 0.002% of service members perish in conflict, and identification of that 0.002% through DNA analysis is necessary only 0.0052% of the time, as happened in the Gulf War, the military's need to collect and store DNA from all service members is even less compelling. The DoD established its DNA Repository to eliminate DNA identification problems experienced during the Gulf War. n124 However, the DoD identified every individual who perished in connection with the Gulf War, and DNA analysis was necessary in only two of those 388 cases. This leads one to question the extent of these alleged \22DNA identification problems.\22\par
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n124. See \i Mayfield v. Dalton, 901 F. Supp. 300, 302 (D. Haw. 1995),\i0 v acated, \i 109 F.3d 1423 (9th Cir. 1997).\i0 \par
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C. Inability to Use DNA for Identification Purposes\par

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Remains DNA is not an inert substance. If contaminated or destroyed, it can no longer be used for the purposes of remains identification. The DoD would then have to rely on traditional methods of identification, and any antemortem DNA stored in the DNA repository would be useless. n125\par

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n125. See supra notes 117-23 and accompanying text for a description of the traditional methods of remains identification utilized in the Gulf War. \par

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Since the battlefield is not a sterile location in which DNA samples are isolated from environmental contaminants, there exists a danger of contamination from both biological and non-biological sources. n126 \22The violent circumstances that render remains identification by DNA analysis necessary are also the circumstances most likely to intermingle DNA materials with surrounding contaminants.\22 n127 Contamination may cause remains misidentification or render DNA identification impossible. n128\par

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n126. See Simmons, supra note 13, at 12. Cf. William C. Thompson & Simon Ford, DNA Typing: Acceptance and Weight of the New Genetic Identification Tests, 175 Va. L. Rev. 45, 66 (1989) (noting that the environmental conditions of a crime scene can widely vary). The conditions experienced at the crime scene may be very similar to battlefield conditions when one considers the extent of the violence and lack of sterility or predictability. One author aptly stated, \22there is no telling what happened to these things before we get them.\22 I d. (describing the condition of DNA samples taken from a crime scene). \par\par

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n127. Simmons, supra note 13, at 12. \par\par

n128. See Paul B. Tyler, Fundamental Misunderstandings About DNA Contamination: Does It Help or Hurt the Criminal Defendant?, 31 Beverly Hills B.A. J. 15, 21 (1996). \par

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Biological contamination of DNA occurs when DNA from a different biological entity is introduced into the DNA sample extracted from the remains. n129 This unwanted DNA may come from human or non-human sources. n130 Since plant or animal DNA may be distinguished from human DNA, addition of these types of DNA to the sample does not usually pose a great danger for remains identification. n131

Bacterial DNA similarly presents no major obstacle to remains identification. n132 However, if a DNA sample is \5B*994\5D contaminated by DNA from another human source, and this \22cross-contamination\22 is not discovered, testing results performed on the sample may produce a false negative identification or lead to misidentification. n133\par

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n129. See id. For example, the DNA sample could be mixed with a sample from another body, or the individual collecting the sample could inadvertently contribute some of his or her own DNA to the sample. Id. \par\par

n130. See id. at 23. \par\par

n131. See id. at 24. \par\par

n132. See Dwight E. Adams et al., Deoxyribonucleic Acid (DNA) Analysis by Restriction Fragment Length Polymorphisms of Blood and Other Body Fluid Stains Subjected to Contamination and Environmental Insults, 36 J. Forensic Sciences 1284 (1991). \par\par

n133. Tyler, supra note 128, at 23 n.46. \par

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Adverse environmental conditions can lead to contamination of DNA by non-biological factors. n134 Light exposure, moisture, heat, radiation, chemical agents, and age may either degrade the DNA sample or cut the DNA into small pieces, making DNA testing impossible. n135\par

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n134. See Laurel Beeler & William R. Wiebe, DNA Identification Tests and the Courts, 163 Wash. L. Rev. 903, 919-20 (1988).\i0 \par\par

n135. See id.; see also U.S. Congress, Office of Technology Assessment, Genetic Witness: Forensic Uses of DNA Tests 46, 62 (1990). The chemical agents referred to include natural enzymes or other chemicals present in the environments such as those found in soil. See Beeler & Wiebe, supra note 134, at 919-20; Christopher G. Shank, Note, DNA Evidence in Criminal Trials: Modifying the Law's Approach to Protect the Accused from Prejudicial Genetic Evidence, 134 Ariz. L. Rev. 829, 871 n.43 (1992).\i0 \par

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Thus DNA identification analysis is not the perfect identification test since DNA can degrade beyond recovery. n136 Whether DNA degradation results from contamination by biological or non-biological sources, it increases the necessity of traditional remains identification methods.\par

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n136. Lorne T. Kirby, DNA Fingerprinting: An Introduction 3 (1990). \par

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D. DNA of Blood Relatives\par

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The DoD DNA Repository consists solely of DNA taken from members of the armed forces, under the theory that if a soldier were killed, matching DNA extracted from the remains to a DNA sample contained in the Repository could identify the body. However, even in the absence of dental records or fingerprints, this is not the only alternative for remains identification. n137\par

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n137. See John Hunter et al., *Studies in Crime: An Introduction to Forensic Archaeology* 128 (1996) (demonstrating that DNA extraction can provide positive identification of remains if DNA records of the deceased's relatives are available); T.M. Clayton et al., *Case Report, Identification of Bodies from the Scene of a Mass Disaster using DNA Amplification of Short Tandem Repeat (STR) Loci*, 76 *Forensic Science Int'l* 7 (1995); William R. Maples & Michael Browning, *Dead Men Do Tell Tales* 206 (1994); Mitchell M. Holland et al., *Mitochondrial DNA Sequence Analysis of Human Skeletal Remains: Identification of Remains from The Vietnam War*, 38 *J. Forensic Sciences* 542 (1993); William D. Haglund et al., *Identification of Decomposed Human Remains by Deoxyribonucleic Acid (DNA) Profiling*, 35 *J. Forensic Sciences* 724 (1990). \par

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\5B*995\5D In August 1991, three individuals in England successfully identified the remains of a young girl despite the fact that they did not have any prior DNA sample against which to compare DNA samples extracted from the remains. n138 The girl was murdered in 1981, and no one discovered her remains for eight years. n139 The English authorities established her identity in part from a facial reconstruction and dental records, but they wished to confirm identity through DNA analysis. n140 Scientists extracted DNA samples from the skeleton and compared them to corresponding DNA profiles taken from the blood of the victim's suspected mother and father. n141\par

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n138. See Erika Hagelberg et al., *Identification of the Skeletal Remains of a Murder Victim by DNA Analysis*, 352 *Nature* 427 (1991). \par\par

n139. See id. \par\par

n140. See id. \par\par

n141. See id. \par

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Of the six sections of the victim's DNA strand that were analyzed, every sample indicated that the DNA was from an offspring of the mother and father tested. n142 All segments tested on the DNA strand could be attributed to either the mother or father. n143 A statistical analysis of this information confirmed the victim's identity with a likelihood of 200,000 to 1. n144 In other words, \2 the DNA data established with a high degree of confidence that the murder victim was indeed the daughter of Mother and Father.\22 n145\par

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n142. See id. \par\par

n143. See id. \par\par

n144. See id. \par\par

n145. Id. at 428. \par

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These results definitively show that an individual's DNA sample need not have been obtained during his or her life to successfully carry out DNA identifica

tion of remains. Thus, DNA identification of a soldier's remains is feasible even though his or her DNA sample is not stored in DoD Registry. The identification of a soldier's remains by comparing remains DNA with that of the suspected parents was in fact successfully carried out shortly after the identification of the murder victim in England.

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n146. See Holland et al., supra note 137, at 543.

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\5B*996\5D This technology is not restricted to cases in which parental DNA is available for comparison. DNA identification may be carried out by comparing the DNA of the deceased to DNA samples from other blood relatives. Following the Branch Dividian incident in Waco, Texas in April 1993 when a number of individuals perished by fire, authorities identified twenty-six individuals through the use of reference blood samples and family trees. The identification process utilized not only the DNA of the victims' parents, but also that of their children and/or siblings in order to reach positive identifications.

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n147. See Clayton et al., supra note 137.

n148. See id.

n149. See id.; see also Hunter, supra note 137, at 166 (demonstrating that DNA identification was expanded to the historical context when DNA extracted from members the Russian Imperial family was compared to DNA extracted from living descendants).

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Apparently the United States Army recognizes that DNA samples from maternal relatives of deceased service members may be used to identify remains. In 1992, approximately one year after the DoD established its DNA collection policy, the Army collected DNA samples from ninety families at a conference of the National League of Family of American Prisoners and Missing in Southeast Asia for the purposes of the identification of remains from the Vietnam Conflict. Thus, having individual DNA on file for every service member is not necessary to successful remains identification; it merely simplifies matters. Restricting DNA identification procedures to use of DNA voluntarily supplied by family members of missing service members could preserve the military's goals of ensuring the peace of mind of family members and of accounting for the fate of service members while maintaining the privacy of the service members' DNA.

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n150. See U.S. General Accounting Office, POW/MIA Affairs: Issues Related to the Identification of Human Remains from the Vietnam Conflict 23 (1992).

n151. See id.

n152. The district court mentioned in Mayfield that identification may be accomplished through the use of DNA which was previously collected from the deced

ent or 'his or her biological relatives.' 901 F. Supp. at 302. The court was thus aware that remains identification via statistical comparison of DNA to that of blood relatives could be carried out.

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IV. Likelihood that the Samples in the DNA Repository Would Be Used for Adverse Purposes

The district court readily dismissed the marines' fears that future harm could result from the collection and storage of their DNA in Gaithersburg, Maryland.

The court restricted its analysis to the degree of intrusion upon privacy rights to which the marines would have been subjected had they supplied DNA samples. Fears of future discriminatory action were deemed nonjusticiable since they were based on a hypothetical situation.

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153. See Mayfield v. Dalton, 901 F. Supp. 300, 304 (D. Haw. 1995), vacated, 109 F.3d 1423 (9th Cir. 1997).

154. See generally id. at 304.

155. See id.

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It is true that no discriminatory action had been taken by the military or a third-party employer based on the genetic information contained in the marines' DNA samples. No such action could have taken place because Mayfield and Vlakovsky refused to provide their samples for submission to the repository. Nevertheless, the potential for future harm based on the improper use of their genetic information merits discussion. As technology has advanced during the past decade, more efficient methods of DNA testing have been developed, more genetic secrets have been unlocked, and stories of genetic discrimination have become more common. How likely is it that the hundreds of thousands of service members providing DNA samples to the repository could become victims of discrimination based on this information?

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156. See Mayfield v. Dalton, 109 F.3d 1423, 1425 (9th Cir. 1997).

157. See Richard Saltus, 'Who Wants to Know,' The Boston Globe, Oct. 12, 1997, at 8 ('Discrimination on the basis of genes isn't entirely new....

But now, with the advent of tests for genes that influence one's risk of common disorders such as cancer and heart disease, genetic discrimination concerns are far more widespread.').

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A. Third-Party Employers

Employers who gain access to the records held by the DoD in Maryland could engage in genetic screening, testing the DNA of an applicant or employee

o predict whether she is genetically predisposed to a develop disease. n158 Employers are primarily motivated to engage in such screening for financial reasons, in order to avoid the increasing costs of employer-provided health care and the costs of modifying work conditions in occupationally risky environments. n159\par

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n158. Ruth Hubbard, *Exploding the Gene Myth: How Genetic Information Is Produced and Manipulated by Scientists, Physicians, Employers, Insurance Companies, Educators and Law Enforcers* 130-31 (1997). Surveys conducted by the Office of Technology Assessment in 1982 and 1989 suggested that genetic screening is not being widely used in industry. See *id.* at 134. However, the response rate for the surveys was only 6%, and no additional surveys have been conducted by the OTA since that time. See *id.*; see also Elaine Draper, *Risky Business: Genetic Testing and Exclusionary Practices in the Hazardous Workplace* 11 (1991); Roberto Pulver, *Genetic Screening in the Workplace: a Fit for Consumers?*, 5 *Loy. Consumer L. Rep.* 13, 14 (1992). \par\par

n159. See Mark A. Rothstein, *Genetic Discrimination in Employment and the Americans with Disabilities Act*, 29 *Hous. L. Rev.* 23, 28-29 (1992)\i0 \i5Bhereinafter *Employment and the ADA*\i5D; Draper, *supra* note 158, at 13. \par

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During the past decade, the cost burden shouldered by employers who provide health insurance for their employees has increased dramatically. n160 For example, from 1985 to 1991, the cost of health insurance for each employee increased from \$1724 to \$3605 per year. n161 Costs continue to increase by approximately ten to twenty percent each year. n162 Employers are experiencing strong financial motives to reduce the overall cost of providing health insurance for employees. n163 One response is to engage in genetic discrimination, simply eliminating those employees who would need greater or more expensive health care services. n164\par

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n160. See *vi* *Employment and the ADA*, *supra* \i0 note 159, at 28-29. \par\par

n161. See *id.* \par\par

n162. See *id.*; see also Burk Burnett, *Genetic Discrimination: Legislation Required to Keep Genetic Secrets*, 21 *Seton Hall Legis. J.* 502, 506 n.21 (1997). \par\par

n163. See Hubbard, *supra* note 158, at 131; Matthew W. Finkin, *Privacy in Employment Screening* 3 (1995); Mark A Rothstein, et al., *Employment Law* 2.25 (1994); see also *vi* *Employment and the ADA*, *supra* \i0 note 159, at 29 (noting that an employer may avoid hiring, for example, cigarette smokers, people who are HIV positive, or people with high cholesterol levels); Larry Gostin, *Genetic Discrimination: The Use of Genetically Based Diagnostic and Prognostic Tests by Employers and Insurers*, 17 *Am. J.L. & Med.* 109, 119 (1991).\i0 \par\par

n164. See *id.*; see also Henry T. Greely, *Health Insurance, Employment Discrimination, and the Genetics Revolution*, in *The Code of Codes* 269 (Daniel J. Kevles & Leroy Hood, eds. 1992) (\i22When employers can select their own workers and design their own health benefit plans, their incentive to save money on health costs makes added information about the expected future health of current or

potential employees dangerous.\22). In 1993, the NIH-DOE Task Force on Genetic Information and Insurance completed a study focusing on the potential effects of the availability and accessibility of genetic information in the health care arena. Task Force on Genetic Information & Insurance, NIH-DOE Group on Ethical, Legal & Social Implications of Human Genome Research, Genetic Information & Health Insurance I (1993) \5Bhereinafter Task Force\5D. One of the Task Force's final recommendations was to make participation in and access to health care services independent from a person's employment. See id. at 2, 11. Such action could eliminate the strong incentive for employers to avoid hiring or to terminate employment of potentially unhealthy employees. See generally id. at 11. \pa

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 \5B*999\5D Additional labor costs which employers try to reduce include the expense of absenteeism, sick leave, disability benefits, and training new employees to replace those lost to illness or death. n165 Screening may be used to identify workers or applicants whose future health could be at risk, thereby weeding out undesirable costly candidates. n166\par

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 n165. See Hubbard, *supra* note 158, at 131. \par\par
 n166. Id. \par
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 Instances of genetic discrimination committed for reasons such as those mentioned above have already occurred in connection with employment. n167 For example, once a young social worker's employer discovered that she was at risk to develop Huntington's chorea, she was given a poor performance review and subsequently fired. n168 All of her prior job reviews had been excellent. n169 A fellow worker informed the young social worker that her employer was worried about her developing the disease. n170 In another instance, a woman indicated on a pre-employment form that she had Charcot-Marie-Tooth Disease (CMT), a neuromuscular disorder known to have variable levels of manifestation. When her interviewer found out what this heritable disease was, he did not hire her. n171 Furthermore, a young man carrying an allele associated with Gaucher disease, a recessive condition, was not allowed to enlist in \5B*1000\5D the Armed Forces. n172 The carrier condition would never have manifested itself. n173 In another instance, a man's son was severely disabled due to a genetic disease. n174 This man learned while participating in his company's annual insurance negotiations to select a health insurer that his son's illness was actually a liability to the firm. n175 One insurer dropped the company on grounds that the company failed to inform the insurer of the boy's pre-existing condition. n176 Bidding insurance companies notified the firm that rates for the firm would be considerably lower if the man and his family were dropped from coverage. n177 The man felt that he was denied promotion at the firm due to all of the insurance difficulties stemming from his son's genetic illness. n178\par

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 n167. See Paul R. Billings et al., *Discrimination as a Consequence of Genetic Screening*, 50 Am. J. Hum. Genetics 476 (1992); C. Thomas Caskey & Belinda J.F

. Rossiter, The Genome Project and Clinical Medicine, in Legal and Ethical Issues Raised by the Human Genome Project 44-45 (Mark A. Rothstein ed., 1991); Vinc e Bielski, Your Boss Wants More Than Your Blood: Genetic Testing Comes to the W orkplace, 16 California Lawyer 18 (Nov. 1996); Rosemary Orthmann, Ph.D., Geneti c Testing Can Lead to Job Discrimination, Empl. Testing (Univ. Pub. Am.) 174 (N ov. 1996) (referring to a recent survey of 332 people in which 43% indicated th at they had in fact experienced genetic discrimination in employment, health in surance, or life insurance). \par\par

n168. See Bielski, supra note 167, at 18. \par\par

n169. See id. \par\par

n170. See id. \par\par

n171. See id; see also Billings, supra note 167, at 479. \par\par

n172. See Billings, supra note 167, at 15. \par\par

n173. See id. \par\par

n174. See Task Force, supra note 164, at 7. \par\par

n175. See id. \par\par

n176. See id. \par\par

n177. See id. \par\par

n178. See id. \par

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In addition, genetic screening has been implemented in accordance with the s usceptibility doctrine. n179 Under this theory, employees in hazardous occupati ons are specifically tested for any inherited traits which could predispose the m to occupational disease. n180 Employers ordinarily target diseases which envi ronmental conditions in the workplace would likely exacerbate. n181 Under this policy, workers possessing genetic indicators of disease may be removed from mo re hazardous conditions in order to decrease the chances of disease manifestati on. n182\par

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n179. See Draper, supra note 158, at 11. \par\par

n180. See id. \par\par

n181. See id. For example, employees working with substances which are known carcinogens may be screened for the presence of cancer-linked genes. \par\par

n182. See id. at 25. \par

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Such testing could be beneficial in the workplace, since it may actually imp rove the health of those genetically predisposed to disease whose conditions co uld be worsened by exposure to a hazardous work environment. n183 However, gene tic screening of workers or applicants is not a completely benign procedure. n1 84 Since genetic screening is \5B*1001\5D predictive screening, discrimin atory practices may result. n185 The screening often reveals no more than the p otential for disease manifestation, and, in many cases, the individual possessi ng the genetic trait is asymptomatic. n186 In these circumstances, employment d ecisions are based, not on an individual's present ability to perform a certain task, but on the risk of future disability to perform due to disease, a disab ility which may never materialize. n187 Moreover, employers' interpretation of genetic screening may lead to the exclusion of individuals who are merely disea

se carriers as well as people who only stand to develop a minor form of the genetically-linked disease. n188\par

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n183. See Gostin, *supra* note 163, at 111. \par\par

n184. See David F. Linowes, *Privacy in America: Is Your Private Life in the Public Eye?* 15-16 (1989). \par\par

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While employers say the tests lower medical costs and enable susceptible workers to avoid hazardous employment, many labor leaders and those concerned with personal privacy see dangers in labeling certain individuals or groups as "high risk." Such labeling could involve a loss of career or health care coverage for the worker.\par

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Id. \par\par

n185. See Mark A. Rothstein, *Medical Screening and the Employee Health Cost Crisis I* (1989) \5Bhereinafter *Medical Screening*\5D. \par\par

n186. See Kristie A. Deyerle, *Genetic Testing in the Workplace: Employer Dream, Employee Nightmare - Legislative Regulation in the United States and the Federal Republic of Germany*, 18 *Comp. Lab. L.J.* 547, 556 (1997), *ii0* citing Marvin R. Natowicz et al., *Genetic Discrimination and the Law*, 50 *Am. J. Hum. Genetics* 465, 465 (1992); see also Hubbard, *supra* note 158, at 24 ("We all carry alleles that would be disabling or lethal if we or our children had two copies of them instead of just one."). The term asymptomatic refers to physically and/or psychologically healthy individuals who are treated as disabled or ill based on an abnormal genotype. See Billings et al., *supra* note 167, at 479. An asymptomatic individual exhibits no symptoms of disease. See Webster's Ninth New Collegiate Dictionary 111 (1990). \par\par

n187. See Hubbard, *supra* note 158, at 12 ("All too often genes are looked on as absolute predictors.... We must remember that genetic functions are embedded in complex networks of biological reactions and social and economic relationships."); Gostin, *supra* note 163, at 118; see also Dorothy Nelkin, *The Social Power of Genetic Information*, in *The Code of Codes* 188 (Daniel J. Kevles & Leroy Hood, eds. 1992) (noting that in many cases the risk for genetic disease has been treated the same as actually having the disease, even if there are no "obvious manifestations of illness"). \par\par

n188. See Gostin, *supra* note 163, at 118; T.H. Cushing, *Should There Be Genetic Testing in Insurance Risk Classification? Arguments Both For and Against the Use of this New Technology May be "Right" and Some Form of Universal Health Care May be the Result*, 60 *Def. Couns. J.* 249, 251 (1993). \par\par

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\5BGenetic testing\5D will reveal the potential for a person, who may appear to be perfectly healthy in all respects, to develop a disease many years in the future. The chances that a person currently asymptomatic will contract a particular disease will vary depending on the disease and the person's genetic composition. Some people will have a higher predisposition to certain diseases, while others will face the certainty that the particular illness will appear.\par

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Id. \par

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\5B*1002\5D Despite increasing concerns in recent years regarding genetic discrimination, no federal legislation directly addresses this problem. n189 Although a former service member who works in the private sector could potentially bring a cause of action under the Rehabilitation Act of 1973, n190 Title I of the Americans with Disabilities Act (ADA), n191 or Title VII of the Civil Rights Act of 1964 n192 if he were discriminated against on the basis of his genetic make-up, n193 it is unclear whether such a cause of action would have any potential for success. Noting this absence of protection, fourteen states have passed laws to protect victims of genetic discrimination. n194 However, with the lack of any protection whatsoever in the remaining thirty-six states, one may understand why the marines in Mayfield, along with hundreds of other Americans, fear that they too will become casualties in the recent cost-cutting trend.\par

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n189. See Gostin, *supra* note 163, at 119. \par\par

n190. Rehabilitation Act of 1973, \i 29 U.S.C. 791\i0 (1994). \par\par

n191. Americans with Disabilities Act of 1990, \i 42 U.S.C. 12101\i0 (1994)

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n192. Civil Rights Act of 1964, \i 14 U.S.C. 2000e\i0 (1994). \par\par

n193. See Gostin, *supra* note 163, at 119-20; Deyerle, *supra* note 186, at 566; \i Employment and the ADA, *supra* \i0 note 159, at 33-34; Pulver, *supra* note 158, at 17-18. \par\par

n194. See *infra* notes 258-86 and accompanying text. \par

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1. Rehabilitation Act of 1973. The Rehabilitation Act of 1973 was promulgated to help individuals with disabilities '\22maximize their leadership, empowerment, independence, and productivity'\22 and better integrate into society n195 by prohibiting employers from discriminating against people with disabilities. n196 The Act applies to entities who receive federal subsidies or contracts, n197 but can apply to federal agencies themselves, except in circumstances where the federal agency plays the role of an employer. n198 This constituted the first attempt to include disabled individuals '\5B*1003\5D within the '\22mainstream of American society,'\22 n199 and the elements of disability discrimination established under this Act were adopted by the 1990 ADA and expanded to the private sector. n200\par

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n195. \i 29 U.S.C. 796.\i0 See also Kathleen Zeitz, *Employer Genetic Testing: A Legitimate Screening Device or Another Method of Discrimination?*, \i 42 Lab. L.J. 230, 234 (1991).\i0 \par\par

n196. See Rehabilitation Act of 1973, \i 29 U.S.C. 791\i0 (1994). \par\par

n197. See \i 29 U.S.C. 793.\i0 \par\par

n198. See \i 29 U.S.C. 794\i0 (a). \par\par

n199. \i 29 U.S.C. 796.\i0 See Medical Screening, *supra* note 185, at 125; see also Natowicz et al., *supra* note 186, at 468. \par\par

n200. See Pulver, *supra* note 158, at 19; see *infra* notes 238 to 259 and accompanying

mpanying text for information on the Americans with Disabilities Act. \par
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In order to gain protection under the Rehabilitation Act, an employee would first have to demonstrate that she would be considered disabled due to her genetic condition. n201 A disabled person is defined as: \22any person who (i) has a physical or mental impairment which substantially limits one or more major life activities, (ii) has a record of such an impairment, or (iii) is regarded as having such an impairment.\22 n202 Once this is demonstrated, the employee must meet three additional requirements. She must show that but for the genetic impairment, she would be fully qualified to perform the job, that she was excluded from the job solely because of the disability, and that the program from which she was excluded is one which is \22receiving Federal financial assistance or... conducted by any Executive agency or by the United States Postal Service.\22 n203\par

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n201. See \i 29 U.S.C. 791\i0 (g). See also Hubbard, supra note 158, at 136; Pulver, supra note 158, at 18. \par\par

n202. 45 C.F.R. 84.3(j)(1) (1998). \par\par

n203. \i 29 U.S.C. 794\i0 (a). See \i Bentivegna v. United States Dep't of Labor, 694 F.2d 619, 621 (9th Cir. 1982);\i0 \i Doe v. New York Univ., 666 F.2d 761, 774-75 (2d Cir. 1981).\i0 \par

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In response, the employer would have to provide a \22reasonable accommodation\22 for the employee. n204 The failure to provide a reasonable accommodation is unlawful discrimination unless the employer can show that making such an accommodation would cause him or her undue hardship. n205 Undue financial burden on the employer would legitimately excuse the employer from having to accommodate a disabled individual, n206 but the employer may not exclude people with disabilities from the workplace solely based on the fear of future health care costs. n207 Examples of reasonable accommodations include things such as modified work schedules, transfer of job tasks to \5B*1004\5D coworkers, provision of auxiliary aids (such as a part-time reader for a blind employee), and removal of structural or architectural barriers for employees who are mobility-impaired. n208\par

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n204. 28 C.F.R. 41.53 (1988). \par\par

n205. See id. \par\par

n206. See Zeitz, supra note 195, at 234-35. \par\par

n207. See Natowicz, supra note 186, at 469. \par\par

n208. See id. \par

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Case law shows that the Rehabilitation Act could apply to future health risks which have not yet impeded an employee's performance, provided that the potential impairment at issue was substantial. n209 In E.E. Black, Ltd. v. Marshall,

the pre-employment medical exam of a carpenter revealed a lower back problem for which he was denied employment. n210 Though the condition could have disabling effects in the future, it did not prevent the carpenter from performing job tasks at the time of his medical exam. n211 The court concluded that the carpenter's condition qualified as an impairment or a condition regarded as an impairment which could constitute a substantial handicap to his employment. n212 In so ruling, the court impliedly accepted the notion that the Rehabilitation Act could apply to situations in which a person is denied employment because of a potential future injury.\par

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n209. See Medical Screening, *supra* note 185, at 128-30. \par\par

n210. \i 497 F. Supp. 1088 (D. Haw. 1980).\i0 \par\par

n211. See \i id. at 1091-92.\i0 \par\par

n212. See \i id. at 1102-03.\i0 \par

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Cases concerning AIDS which have been brought under the Rehabilitation Act suggest that this Act could be used to fight genetic discrimination. n213 AIDS has been generally classified as a '22handicap'22 under section 794 of the Rehabilitation Act. n214 In some cases, the courts made this determination even though the HIV-positive individual was completely asymptomatic. n215 Thus, lack of observable '5B*1005'5D symptoms does not preclude an individual from protection under the Act, provided that the employer regards her as disabled. n216\par

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n213. See \i Leckelt v. Board of Comm'rs. of Hosp. District No. 1, 909 F.2d 820, 824-25 (5th Cir. 1990);\i0 \i Doe v. Garrett, 903 F.2d 1455, 1459 (11th Cir. 1990);\i0 \i Glanz v. Vernick, 756 F. Supp. 632, 635 (D. Mass. 1991);\i0 \i Doe v. Centinela Hosp., No. CV87-2514 PAR, 1988 WL 81776,\i0 at *1 (C.D. Cal. June 30, 1988). \par\par

n214. \i 29 U.S.C. 794.\i0 See \i Leckelt, 909 F.2d at 824-25\i0 (assuming for appeal purposes that seropositivity is a protected impairment under the Rehabilitation Act); \i Garrett, 903 F.2d at 1459\i0 (noting that it is '22well established that infection with AIDS constitutes a handicap for the purposes of the '5BRehabilitation'5D Act'22); \i Glanz, 756 F. Supp. at 635\i0 (recognizing that several districts and the Department of Justice have categorized HIV-positive status as a '22handicap'22 within the meaning of the Rehabilitation Act); \i Centinela, 1988 WL 81776,\i0 at *6. \par\par

n215. See \i Garrett, 903 F.2d at 1457;\i0 \i Centinela, 1988 WL 81776,\i0 at *4 ('22Plaintiff is currently, to law observation, asymptomatic. He has not yet suffered from any opportunistic infections.... Nor does he presently have limitations on the functions of caring for himself, performing manual tests, walking, seeing, hearing, speaking, breathing, learning or working.'22). It is important to note, however, that the use of the term '22asymptomatic'22 with AIDS is a bit misleading. See \i Bragdon v. Abbott, 118 S. Ct. 2196, 2204 (1998).\i0 During the asymptomatic phase of AIDS, conditions such as '22lymphadenopathy, dermatological disorders, oral lesions, and bacterial infections'22 will manifest themselves in the HIV seropositive individual. See *id*; *infra* notes 238-39 and accompanying text. \par\par

n216. See *Garrett*, 903 F.2d at 1458-59 (noting that HIV infection may be considered a handicap as defined in the Rehabilitation Act); *Centinela*, 1988 WL 81776, at *4, 6 (concluding that an asymptomatic patient was perceived as handicapped).

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In order to determine whether genetic discrimination would be protected under this Act, one must determine whether the case law concerning asymptomatic HIV positive individuals will be applied to situations in which an asymptomatic individual possesses a gene which increases his likelihood of developing a disease. A major difference between these two groups is the probability of the onset of disease. When a person is HIV-positive, they will inevitably develop either full-blown AIDS or a less severe form of illness known as AIDS-Related Complex (ARC). In any event, medical research shows that once infected, an HIV-positive individual "follows a predictable and... unalterable course" from infection to death. n217 On the other hand, possession of a gene linked to disease does not guarantee that such disease will manifest itself in most cases; it only increases likelihood that a person will manifest the disease. Could an employee still be regarded as disabled by an employer, when, in addition to being asymptomatic, she may never manifest any disease? This question remains to be answered by the courts.

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n217. *Braddon*, 118 S. Ct. at 2203 (summarizing scientific research presented in the case and relied upon by the Court).

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2. The Americans with Disabilities Act of 1990. When enacted in 1990, Title I of the American with Disabilities Act (ADA) n218 essentially extended protections created under the Rehabilitation Act to employees in the private sector. n219 Under the ADA, disability is broadly defined as: "(A) a physical or mental impairment that substantially limits one or more of the major life activities... (B) a record of such impairment, or (C) being regarded as having such an impairment." n220 Thus, a person may have a disability if she possesses an actual incapacity, n221 if she recovered from an actual incapacity, n222 or if she is perceived by society as being disabled, despite the lack of any real incapacity. n223

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n218. Americans with Disabilities Act of 1990, 42 U.S.C. 12101 (1994).

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n219. See 42 U.S.C. 12111-17; Deyerle, *supra* note 186, at 568; Pulver, *supra* note 158, at 19; Gostin, *supra* note 163, at 120.

n220. 42 U.S.C. 12102(2).

n221. See 12102(2)(A).

n222. See 12102(2)(B). For example, an employee who recovered from a very limiting or potentially fatal disease such as cancer may be subjected to discrimination by employers who are aware of the record of that employee's disability. See Gostin, *supra* note 163, at 122. Such an employer may choose not to hire the recovered individual out of fear that the disease may return and interfere with

h job performance or subject the employer to high health care costs. Id. \par\par

n223. See 12102(2)(C). Some individuals are discriminated against based on the possession of a stigmatic condition that society wrongly perceives as disabling. See Gostin, supra note 163, at 123. \par

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In addition to possessing a disability, the individual seeking relief under the ADA must be a 'qualified' individual - a person who, 'with or without reasonable accommodation, can perform the essential functions of the employment position that such individual holds or desires.' n224 The employer may identify these essential job operations n225 which a qualified individual would have to be able to perform at the time of her application for employment. n226

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n224. 42 U.S.C.A. 12111(i)(8). \par\par

n225. See Zeitz, supra note 195, at 236. \par\par

n226. See Pulver, supra note 158, at 19. \par

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It is not evident whether ADA would protect an individual subjected to genetic discrimination. Examination of the legislative history of the ADA indicates that the subject of genetic discrimination received little attention at the time of the ADA's enactment. n227 Although the dangers of genetic discrimination were recognized, in particular those relating to former sickle cell screening programs, n228 Congress decided that the courts should be left to determine whether genetic discrimination was included within the confines of this Act. n229 Thus, if an employer chooses not to hire an individual based on a genetic profile revealing the 'risk of future disease, but such disease has not yet and may never manifest itself, no one is certain whether the applicant or employee may seek protection under the ADA. n230\par

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n227. See Gostin, supra note 163, at 121. \par\par

n228. See infra Part IV.B. \par\par

n229. See Gostin, supra note 163, at 121. \par\par

n230. See Rothstein, Employment and the ADA, supra note 159, at 47-48

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Although the Equal Employment Opportunity Commission (EEOC) states that such a person should be considered disabled, since she would fall under the 'regulated as' provision of sec. 12102(2)(C) of the Act. n231 The Commission's 1995 Compliance Manual contains an example of such a situation even though courts may not accept this position. n232.\par

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n231. Richard H. Underwood & Ronald G. Cadle, Genetics, Genetic Testing, and the Specter of Discrimination: A Discussion Using Hypothetical Cases, 85 Ky L.J. 665, 677 (1997) (quoting Arpiar Saunder, Jr. & Bennett B. Mortell, Genetic Testing-Genetic Discrimination: State and Federal Statutes Provide Possible Remedies, N.H. B.J., Dec. 1995, at 23, 30).

n232. See Underwood, supra note 231 n.46, at 678, citing Robert L. Duston, Courts Will Scrutinize EEOC's Definition of Disability, Empl. Testing (Univ. Pub. Am.) 97, 101-02 (July 1995) (Based on the trend in the courts... to place reasonable limits on the ADA, it appears likely that the courts will give several aspects of the EEOC's guidelines close scrutiny.); Deyerle, supra note 186, at 572 (Whether the courts will accept such an expanded definition of disability as reflecting Congressional intent is yet to be determined).

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CP's genetic profile reveals an increased susceptibility to colon cancer. CP is currently asymptomatic and may never in fact develop colon cancer. After making CP a conditional offer of employment, R the employer learns about CP's increased susceptibility to colon cancer. R then withdraws the job offer because of concerns about matters such as CP's productivity, insurance costs, and attendance. R is treating the CP as having an impairment that substantially limits a major life activity. Accordingly, CP is covered by the third part of the definition of disability.

There has been speculation that courts could draw an analogy between people who are HIV seropositive but asymptomatic for AIDS, who have been classified as disabled, and individuals possessing a latent genetic condition. HIV is not a genetically-linked disorder, but a person who discovers that he is HIV seropositive may be in a situation very similar to the individual whose genetic profile indicates that she may develop a disease in the future. n236 After an HIV-infected individual passes through the initial acute phase during which it is evident that he or she is sick, n237 the HIV infection passes into what is known as an asymptomatic phase which can last from seven to eleven years. n238 However, unlike an asymptomatic individual who could develop a genetically-linked disease and who experiences no current disorders, an HIV-positive individual in the asymptomatic phase often experiences clinical effects of HIV, such as enlargement of the lymph nodes, skin problems, oral lesions and infections. n239 Thus, an HIV positive individual is not asymptomatic in the true sense of the term.

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n233. EEOC Compliance Manual (CCH) 902.8(a) (1995).
n234. See Bragdon v. Abbott, 118 S. Ct. 2196 (1998); Chalk v. United States Dist. Court, 840 F.2d 701 (9th Cir. 1988).
n235. See Deyerle, supra note 186, at 571-72.
n236. See id.
n237. See Bragdon, 118 S. Ct. at 2203-04. The HIV seropositive individual will experience symptoms similar to those associated with mononucleosis. See id. at 2203. In addition, he can suffer from fever, headache, enlarge

ment of the lymph nodes, muscle pain, depression, gastrointestinal problems, and neurological disorders. See id. \par\par
n238. See \i id. at 2204.\i0 \par\par
n239. See id. \par
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In *Bragdon v. Abbott*, the Supreme Court recognized that the HIV virus negatively affects an individual's health from the moment of infection and is not truly inactive during the so-called '22asymptomatic'22 phase. n240 As such, the Supreme Court held that HIV is '22an impairment from the moment of infection.'22 n241 However, genetic indicators of the potential for disease development differ from the HIV virus in that they do not constitute a physical impairment from the moment of infection. Many genetic indicators represent no more than an increased risk of disease development. n242 Thus, the reasoning which the Supreme Court used to classify HIV-positive individuals as individuals with a disability does not appear applicable to individuals possessing genetic indicators of disease.\par
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n240. \i Id. at 2203-04.\i0 \par\par
n241. \i Id. at 2204.\i0 \par\par
n242. See *Deyerle*, supra note 186, at 556. \par
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However, finding that a condition constitutes a substantial impairment is only the first step of the analysis. The impairment will only be considered a disability if it affects a '22major life activity.'22 n243 In *Bragdon*, the Court held that HIV fulfilled this requirement because it substantially '5B*1009\ '5D interfered with the life activity of reproduction. n244 Unless a court found that a genetic indicator of the potential for future disease was a substantial impairment that interfered with a major life activity such as walking, hearing, breathing, or reproducing, a genetic defect will not constitute a disability. Obviously, the fact that prior to disease manifestation the individual carrying a gene linked to disease experiences no symptoms caused by such gene will make it difficult to prove that the indicator affects any major life activity. Without any cases to support the inclusion of a genetic trait as a disability, employers are not forced into statutory compliance and employees are not protected against genetic discrimination.\par
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n243. \i 42 U.S.C. 12102\i0 (2) (1994). \par\par
n244. \i *Bragdon*, 118 S. Ct. at 2205.\i0 Regulations passed to clarify the Rehabilitation Act elaborate upon what constitutes a major life activity: '22functions such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working.'22 45 C.F.R. 84.3(j)(2)(ii) (1997); 28 C.F.R. 41.31(b)(2) (1997). These regulations apply to the ADA as well the Rehabilitation Act since \i 42 U.S.C. 12201\i0 (a) requires that the ADA be construed consistently with all regulations implemented to interpret the Rehabilitation Act. \par
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3. Civil Rights Act of 1964. Title VII of the Civil Rights Act of 1964 (Title VII) n245 prohibits discrimination in hiring, firing, compensation, or other terms, conditions, or privileges of employment because of an individual's race, religion, gender, or national origin. n246 Title VII applies to all employers with fifteen or more employees, labor organizations, employment agencies, and state or municipal governments. n247\par

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n245. 42 U.S.C. 2000e-17 (1994). \par\par

n246. See 42 U.S.C. 2000e-2(a). \par\par

n247. 42 U.S.C. 2000e(b), (e). \par

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Title VII could be used to combat genetic screening since some genetic traits are most common among particular racial or ethnic groups or are found more frequently among members of one sex. n248 For example, Tay-Sachs and Gaucher's disease are commonly found among Ashkenazi Jews, sickle cell anemia most often affects people of African heritage, and Family Mediterranean Fever is frequently found in Armenians. n249 Risks for congenital abnormalities and risks of fetal genetic damage (teratogenicity) affect women in general or pregnant women in particular. n250 Thus, genetic screening may potentially have a discriminatory impact on members of a protected class and be grounds for a Title VII action. n251\par

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n248. See Deyerle, *supra* note 186, at 567; Pulver, *supra* note 158, at 18; Gostin, *supra* note 163, at 137. See also, Rothstein, *Medical Screening*, *supra* note 185, at 174-79. \par\par

n249. See generally Goldstein & Brown, *Genetic Aspects of Disease*, in *Harrison's Principles of Internal Medicine* 285 (E. Braunwald, et al. eds., 1987). \par\par

n250. See Gostin, *supra* note 163, at 137. \par\par

n251. See Deyerle, *supra* note , at 566-67 ('Because some genetic traits are associated with certain racial or ethnic groups, or found more frequently in one sex than in the other, genetic screening may unintentionally have a disparate impact on members of a protected class.'). Pulver, *supra* note 158, at 18.

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Genetic discrimination claims would most likely be brought under the theory of disparate impact, n252 in which case the plaintiff must prove that the genetic screening, although facially neutral in application, disproportionately eliminated a protected class from opportunities for employment. n253 In order to succeed, the plaintiff need not show that the employer or potential employer harbored any discriminatory intent - the focus is purely on the impact of that employer's actions. n254 However, even if disparate impact is demonstrated, the employer may be let off the hook if he or she can show that there was a business necessity for the employment practice in question. n255 Then the

employer will in fact be allowed to lawfully discriminate against an individual due to his immutable characteristics because the immutable characteristics truly prevent the individual from properly doing the job.

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n252. 42 U.S.C. 2000e-2(k). See also Deyerle, supra note 186, at 567; Gostin, supra note 163, at 138 (stating that protection against genetic discrimination under Title VII would most likely be brought under a disparate impact theory).

n253. See Pulver, supra note 158, at 18.

n254. See *Griggs v. Duke Power Co.*, 401 U.S. 424, 430 (1971) ('Practices, procedures, or tests neutral on their face, and even neutral in terms of intent, cannot be maintained if they operate to freeze the status quo of prior discriminatory employment practices'); Pulver, supra note 158, at 18; Gostin, supra note 163, at 137.

n255. See 42 U.S.C. 2000-e(2)(k)(1)(A)(i).

n256. Pulver, supra note 158, at 18. See also Gostin, supra note 163, at 138 (citing *Hayes v. Shelby Memorial Hosp.*, 726 F.2d 1543 (11th Cir. 1984) and *Wright v. Olin Corp.*, 697 F.2d 1172 (4th Cir. 1982)) (noting that an employee who demonstrates a business necessity for his or her actions is justified in carrying out a practice which might otherwise be considered discriminatory).

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Although it is clear that Title VII could be construed to protect some victims of genetic discrimination, Title VII cannot protect a majority of employees or applicants who are excluded from a position due to their genetic profile. n257 Most genetic disorders or diseases do not predominantly affect a protected class. n258 Unless a protected class is affected, Title VII does not apply. In any event, no plaintiff who was a member of a protected class and brought a cause of action under Title VII for genetic discrimination on a disparate impact theory has ever been successful. n259 Again, employees suffering from genetic discrimination are left with little or no protection.

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n257. See Deyerle, supra note 186, at 567.

n258. See id. at 568.

n259. See id.; see e.g., *Smith v. Olin Chem. Corp.*, 555 F.2d 1283 (5th Cir. 1977) (noting that although discrimination based on bone degeneration did disparately impact a protected class, such discrimination was allowed under the business necessity theory because a good back is an essential job requirement for a manual laborer).

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4. State Laws. In the absence of federal legislation which directly addresses genetic discrimination, some states have enacted their own statutes. n260 Apparently, the few state legislatures who have passed laws to limit the accessibility and use of genetic information recognized that federal efforts to keep up with rapid technological advances have failed. n261 At present, fourteen states have laws which prohibit employers from using genetic information to discrimi

nate against applicants and employees, n262 and additional states are considering similar bills. n263\par

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n260. See Robert Pear, States Pass Laws to Regulate Uses of Genetic Testing, N.Y. Times, Oct. 18, 1997, at A1; Saltus, supra note 157, at 8. \par\par

n261. See Michael M.J. Lin, Conferring a Federal Property Right in Genetic Material: Stepping Into the Future With the Genetic Privacy Act, 22 Am. J.L. & Med. 109, 123 (1996) (discussing legislative responses at the state level).

n262. See Deyerle, supra note 186, at 578-80; Sandra N. Hurd, States Consider Genetic Testing Bills, Employment Testing - L. & Pol'y Rep., Nov. 1997, at 187; hereinafter Hurd, Genetic Testing Bills; Sandra N. Hurd, More States Restrict Use of Genetic Information, Employment Testing - L. & Pol'y Rep., Oct. 1997, at 161; hereinafter Hurd, States Restrict Use.

n263. See infra notes 282-87. \par

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In 1997, New York passed a statute which provided employees and applicants with extensive protection against genetic discrimination in the workplace. n264 Section 296 of New York Executive Law bars employers from discriminating against individuals based on their genetic predisposition or carrier status.

n265 In addition, employers are precluded from requesting, requiring, or administering genetic tests as a prerequisite to employment, unless such testing is directly related to the working environment and is used to protect employees possessing genetic anomalies which create a greater risk of contracting the disease if they were to work in this environment. n267 Under this statute, employees retain the option of consenting to genetic testing in relation to worker's compensation claims, civil litigation, or checking worker's susceptibility. n268\par

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n264. See N.Y. Exec. Law 296 (McKinney 1997). \par\par

n265. Id. 296(1)(a). \par\par

n266. See id. 296(19)(a)(1). \par\par

n267. See id. 296(19)(b). \par\par

n268. See id. 296(19)(c-d). \par

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Laws passed in Texas, n269 North Carolina n270 and Arizona n271 prohibit employers from discriminating against an individual based on genetic information or the results of a genetic test. Oregon's laws bar employers from collecting or using genetic information to distinguish between or discriminate against or restrict any right or benefit otherwise due or available to an employee or a prospective employee unless used with the employee or applicant's consent in order to determine a bona fide occupational qualification. n272 Oklahoma's bill prohibits discrimination against anyone with a genetic predisposition to a genetically-linked health problem and prevents employers from requiring employees or applicants to participate in genetic testing. n273 Maine enacted a statute which prohibits genetic discrimination in employment and protects cer

tain personal information, including genetic test results, against use in insurance transactions. n274 Statutes in California, n275 Delaware, n276 New Hampshire, n277 Iowa, n278 Rhode Island, n279 and Wisconsin n280 are similarly designed to prevent employers \5B*1013\5D from using genetic tests as a condition of employment and using any information supplied in a genetic profile to make employment decisions.\par

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n269. See H.B. 39, 75th Leg., Reg. Sess., 1997 Tex. Sess. Law Serv. 1215 (West).

n270. See 1997 N.C. Sess. Laws 350 (N.C. 1997).

n271. See H.B. 2144, 43d Leg., 1st Reg. Sess. (Az. 1997).

n272. Or. Rev. Stat. 659.036, 659.227 (1995).

n273. See Genetic Nondiscrimination in Employment Act, Okla. Stat. Ann. tit. 36, 3614.2 (West 1998).

n274. See Me. Rev. Stat. Ann. tit. 5, 19301-02 (West 1998).

n275. See Cal. Gov. Code 12921, 12926(h) (West 1998).

n276. See S.B. 337, 139th Gen. Assembly, 2d. Reg. Sess., 1998 Del. Laws 457 (Del. 1998).

n277. See N.H. Rev. Stat. Ann. 141-H:3(I) (1995).

n278. See Iowa Code Ann. 729.6 (West 1995).

n279. See R.I. Gen. Laws 28-6.7-1 (1994)

n280. See Wis. Stat. Ann. 111.372(1) (West 1997).

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South Carolina passed a bill which ensures the confidentiality of genetic information by limiting circumstances under which it may be disclosed. n281 However, this bill focuses predominantly upon the use of genetic information in insurance transactions and does not directly address the protection of genetic information in employment situations. n282 Finally, legislation passed in Illinois requires that employers treat information from genetic testing in a manner \22 consistent with the requirements of federal law, including but not limited to the Americans with Disabilities Act.\22 n283\par

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n281. See S.C. Code Ann. 38-93-10, 38-93-20, 38-93-30 (Law Co-op. 1998).

n282. See id.

n283. 410 Ill. Comp. Stat. Ann. 513/25 (West 1998).

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Additional states considered bills which would combat genetic discrimination by employers. n284 In 1998, Connecticut legislators proposed two bills, H.B. 5471 and S.B. 80, which would have expanded the scope of discriminatory practices by an employer to include requests for genetic information or hiring and firing decisions based upon genetic information. n285 The Connecticut legislature did not pass either of these bills. n286 Utah also proposed, but failed to pass, a bill which would have regulated genetic testing and precluded the use of genetic information in conjunction with hiring, firing, promotion, or any other employment-related determination. n287 Finally, the state of Kentucky passed a re

solution on March 20, 1998 which required that the Legislative Research Commission conduct a comprehensive study of the impact of genetic testing on health, life, and disability income insurance. The results of this study were scheduled for release in May of 1999.

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n284. See Hurd, Genetic Testing Bills, supra note 262.
n285. See Sandra N. Hurd & Rosemary Orthmann, States Mull Genetic Testing Issues in 1998, Employment Testing - L. & Pol'y Rep., May 1998, at 65.
n286. See id.
n287. See id.
n288. S.R. 161, 1998 Reg. Sess. (Ky. 1998).
n289. Id.

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States that have passed legislation banning genetic discrimination have rapidly responded to the sudden technological and biological advances which have made such protection a necessity. Though fourteen states have acted and additional states are likely to consider related bills in their upcoming sessions, victims of such discrimination remain unprotected the thirty-six states that lack genetic discrimination laws. In the absence of federal protections, residents of such states may legally be discriminating against on the basis of their genetic code.

5. Accessibility. If a third-party employer could gain access to the genetic information stored at the DoD DNA Repository, she could conceivably use this information to decide who to hire and fire on the basis of disease risk factors. Although such action would be illegal in the fourteen states with statutes addressing genetic discrimination, discriminatory actions would be legal in states without legislation since no federal law has yet been held to address such conduct. Furthermore, even if an employee or applicant lived in a state in which he was protected against genetic discrimination, he would not bring a cause of action for discrimination against a potential or present employer unless he has an idea that the employer was in fact engaging in genetic discrimination. Commonly, an employee is completely unaware that his employer has obtained access to his genetic profile and acted in a discriminatory manner. The state protections against genetic discrimination could fail to protect people under these circumstances.

The primary question to address, therefore, is whether an employer could somehow gain access to the genetic information held in the DoD DNA Repository. The military has instituted a number of policies in order to protect the information in the repository and ensure that access to the DNA Repository facility, computer system and samples themselves is strictly limited. First of all, individual specimens kept in the Gaithersburg, Maryland facility will be destroyed upon completion of the donor's military service at the request of the donor. Absent such request, the samples are routinely destroyed at the conclusion of fifty years of storage. Secondly, permissible uses of the samples are limited to:

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n290. *Mayfield v. Dalton*, 901 F. Supp. 300, 302 (D. Haw. 1995).

ed, \i 109 F.3d 1423 (9th Cir. 1997);\i0 see also \i Mayfield, 109 F.3d at 1425-26.\i0 \par\par

n291. See \i Mayfield, 109 F.3d at 1425-26 n.1.\i0 \par\par
n292. See id. \par

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(a) identification of human remains; (b) internal quality assurance activities to validate processes for collection, maintenance and analysis of samples; (c) a purpose for which the donor of the sample (or surviving next-of-kin) provides consent; or (d) as compelled by other applicable law in a case in which all of the following conditions are present: (1) the responsible DoD official has received a proper judicial order or judicial authorization; (2) the specimen sample is needed for the investigation or prosecution of a crime punishable by one year or more of confinement; (3) no reasonable alternative means for obtaining a specimen for DNA profile analysis is available; and (4) the use is approved by the \i5BAssistant Secretary of Defense, Health Affairs\i5D after consultation with the DoD General Counsel. n293\par
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The computerized records are apparently kept in controlled areas to which only authorized personnel have access. n294 Unless an individual has a valid requirement or need and is authorized to enter, entry is restricted because the information from DNA is considered confidential. n295 Those who are granted access to the records are trained in the \i22proper safeguarding and use of the information.\i22 n296 Such protections do not necessarily insure that an independent party cannot obtain access to the records held by the U.S. military.\par
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n293. Id.; see also Gill, supra note 12, at 185 (citing Memorandum, Assistant Secretary of Defense (Health Affairs), to Secretary of the Army, subject: Policy Refinements for the Armed Forces Repository of Specimen Samples for the Identification of Remains (Apr. 2, 1996)); \i 63 Fed. Reg. 10205, 10206 (1998).\i0
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n294. See \i 63 Fed. Reg. 10205, 10207 (1998).\i0 \par\par
n295. See id. \par\par
n296. Id. \par
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If no DNA analysis is conducted upon the samples stored at the DNA Repository, the information in the DNA remains encoded and, ideally, causes no harm to any service member. The sole manner of access to genetic information would be to enter the facility, obtain a sample, and perform DNA testing on it. It would appear to be unlikely under these circumstances that a third-party employer would gain access to a service member's or former service member's genetic information. \par\par

However, while the cost to continuously refrigerate millions of blood and cheek cell samples for up to fifty years \i5B*1016\i5D is presumed to be rather high, the cost of genetic testing continues to drop. It is likely that in the future the cost benefit of storing the samples will be less than the cost benefit of decoding the genetic information in the sample and electronically storing

ng the information. n297 If this occurred, anyone who gained electronic access to the record could successfully retrieve information regarding a service member by entering that person's surname, social security number, specimen reference , or Armed Forces Institute of Pathology accession number, and date of birth. n298 In analyzing record accessibility, the focus will be on the security or potential lack of security of the DoD's computer system.\par

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n297. In fact, some identifying information may currently be electronically stored. See id. ('22Storage: Records are stored manually and electronically.' 22). \par\par
n298. See id. \par
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6. Information Privacy. In his 1989 book Privacy in America: Is Your Private Life in the Public Eye?, David Linowes explored the extent to which people readily relinquish personal information and third parties such as governmental authorities, employers, insurance companies, and financial institutions access and store this data. n299 In our information-based society, information is power. Computers augment this power by increasing one's capacity to collect, retrieve, and process information. n300\par
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n299. See generally Linowes, supra note 184. \par\par
n300. See id. at 16. See also Arthur Allen, Exposed; Computer Technology, Managed Health Care and Genetic Science are all Undermining the American Tradition of Medical Privacy, in the Name of Progress. What Can - or Should - We Do About It?, Wash. Post Mag., Feb. 8, 1998, at 11, 12 ('22The more information available '5Bon computers'5D, the greater the opportunity for it to be abused.'22). \par
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With all of the technological advancements enjoyed during the past few decades, many would be surprised to learn that no computer or computer system is totally secure. n301 A former CIA employee noted ten years ago, '22there is no such thing as an entirely secure electronic-data or voice communication network anywhere.'22 n302 This same problem exists today. Apparently, we do not yet have the ability to completely protect large-scale computer systems, n303 and the explosion in use of computers and '5B*1017'5D telecommunications has provided an open forum for computer crime. n304 By computerizing records, organizations make their information vulnerable to discovery, since parties can then attempt access using legal or illegal methods. n305 '22A \$500 investment in equipment can give anyone in a van parked along the curb the ability to read off information appearing on computer screens in offices several stories above the street, and more sensitive equipment can pick off computer data from two kilometers away.'22 n306 In addition, sophisticated computer users have a variety of techniques at their disposal to gain access to secured information. n307 '22Electronic piggybacking'22 is a process whereby an individual bypasses an automated electronic identification verification control in the computer system, thus gaining access. n308 By '22impersonation,'22 the user gains access through the

use of the identity of an authorized user, usually through improper acquisition of their password, n309 identification card or passkey. n310 \5B*1018\5D \22Superzapping\22 occurs when an individual uses a universal access program, normally only used in case of emergency, to break into a system. n311 Finally, a person may use a \22trapdoor\22 to gain entry. n312 These are simplified means of entry created by the systems designer which often operate on the basis of a password. n313 By combining these methods, among others, computer hackers n314 or crackers n315 enjoy a high rate of success for information access - nearly 66% - and are able to avoid detection 99% of the time. n316\par

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n301. See id.. \par\par

n302. See id at 17. \par\par

n303. See id at 10 (discussing comments by Donn Parker, who was a senior management systems consultant at SRI International and the author of the book Computer Security Management). \22No computer system can ever be risk-free if for no other reason than its ultimate reliance upon humans who are error-prone, fallible, and amenable to corruption.\22 Id. at 74. \par\par

n304. See generally Priscilla M. Regan, Legislating Privacy: Technology, Social Values and Public Policy (1995); Jon Jefferson, Deleting Cybercrook: Prosecutors Want Tough Laws to Put Internet Hackers, Scam Artists and Pedophiles on Permanent Log Off, A.B.A. J., Oct. 1997, at 72; How Ethical Hackers Pinpoint Security Weaknesses: In the Struggle to Protect Computer Systems Against Unauthorized Access, Companies Worldwide Spend More Than \$6bn a Year on Security Expertise, Financial Times (London), Sept. 3, 1997, at O1 (describing the increased use of computer crime as a means of making a living). A study conducted in 1992 by USA Research Inc. revealed that the number of \22unauthorized intrusions\22 to computers in the U.S. workplace increased from 339,000 in 1989 to 684,000 in 1991. Wade Roush, Hackers: Taking a Byte out of Computer Crime, Mass. Inst. of Tech. Alumni Ass'n Tech. Rev., April 1995, at 32. \par\par

n305. See Fred W. Weingarten, Information Technology and Privacy Trends in Products and Services, in Invited Papers on Privacy: Law, Ethics and Technology, 15, 23 (1981). \par\par

n306. Linowes, supra note 184, at 70. A 16-year-old British hacker known as the \22Datastream Cowboy\22 used a \$1200 computer to gain access to military data in the Air Force's Rome Laboratory, Wright Patterson Air Force Base, and NASA's Goddard Space Flight Center. See J. Scott Orr, Hacking Their Way Into Our Lives, The Plain Dealer, July 13, 1997, at 1E. \par\par

n307. See Linowes, supra note 184, at 73. \par\par

n308. Id. \par\par

n309. If an individual leaves her computer station without exiting the program she is working on, a hacker can simply sit down at that computer and continue usage. This is known as \22hijacking\22 a password. See Graeme Browning, Hack Attacks, Nat'l J. Gov't Executive, Aug. 1997, at 23. \par\par

n310. See Linowes, supra note 184, at 73. \par\par

n311. Id. \par\par

n312. Id. \par\par

n313. See id. \par\par

n314. According to the Free On-Line Dictionary of Computing, \22hacker\22 is defined as \221. A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary.\22 <<http://wagner.princeton.edu/foldoc/ogi-script?query=hacker>> (Dec. 1, 1994) (on file with Buffalo Law Review).

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n315. The term cracker refers to those who break into computer systems with the purpose of stealing data or vandalizing. See Maria O'Daniel, Lab Report Resources: Hacking, Cracking and Phreaking, Computimes (Malaysia), Dec. 11, 1997, at 54. Cracker has been defined as '\22A malicious meddler who tries to discover sensitive information by poking around.\22 <<http://wagner.princeton.edu/foldoc/cgi-script?query=hacker>> (Dec. 1, 1994) (on file with Buffalo Law Review).

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n316. See Jefferson, *supra* note 304. \par

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Unfortunately, records kept by the United States government are no more secure than any other computerized record. n317 In December 1994, hackers gained access to the U.S. Naval Academy's computer systems, causing '\22considerable disruptions to the academy's ability to process and store sensitive information.\22 n318 During the following two years, an Argentinean hacker penetrated the computers at the Naval Research Laboratory, NASA and Los Alamos National Laboratory, along with other sites belonging to the Department of Defense. n319 Prior to the Gulf War, Dutch hackers broke into the computer records held at thirty-four U.S. military sites, discovering locations of U.S. troops, data on the Patriot missile, and information concerning the movement of American warships, which '\5B*1019\5D they then attempted to give to Iraq. n320 Hackers have also gained access to web sites belonging to the Air Force and NASA. n321\par

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n317. See generally Browning, *supra* note 308, at 23; see also Orr, *supra* note 305, at 1E. \par\par

n318. Browning, *supra* note 308, at 23. \par\par

n319. See *id.* \par\par

n320. See *id.* \par\par

n321. See *id.*; see also O'Daniel, *supra* note 315, at 54. In August of that year, the web site for the Department of Justice had to be shut down at 2:45 a.m. after hackers replaced the picture of the Attorney General with that of Adolf Hitler and changed the Department's name to the Department of Injustice. See *id.*; see also Alan Paller, Avoiding Attacks, Nat'l J. Gov't Executive, Aug. 1997, at 26. The hackers who gained access to the CIA Web site changed the agency's posted name to the '\22Central Stupidity Agency,\22 added obscenities to the page, and linked the site to one belonging to Playboy magazine. '\5BPrepared statement of Sen. Patrick Leahy before the Sen. Judiciary Comm., Subcomm. on Technology, Terrorism and Gov't, Information. Subject-Internet Crimes Affecting Consumers, Mar. 19, 1997, Fed. News Service\5D. \par

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Records kept by the Department of Defense are particularly difficult to protect from attack. A 1996 study by the General Accounting Office calculated that in 1995, the Defense Department's computers might have been broken into as many as 250,000 times, and the number of break-ins in 1996 could be twice that. n322 The high incidence of success among hackers targeting the DoD may be linked to DoD problems training staff members to operate its computer network. n323 The DoD often cannot match salaries offered to network personnel in the private sector, and thus lose a good number of their valuable employees. n324 Moreover, m

embers of the military staff rotate job assignments every two to four years, creating a situation in which a great deal of time must be spent training new personnel to set up and maintain the DoD networks.

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n322. See Stephen Green, Hackers Penetrate Pentagon in 'Catalog of Horrors,' Copley News Service, Feb. 13, 1997. It is interesting to note that the General Accounting Office has also estimated that hackers successfully infiltrate (meaning actually access secured information) Pentagon computers 160,000 times a year. See id.

n323. See Sami Lais, DoD Looks Forward to the Day It Can Replace Its Communications Tangle With a Sleek, Secure Network, Gov't Computer News, Oct. 13, 1997, at 49.

n324. See id.

n325. See id.

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Thus it would appear that access to the electronic databases connected to the DoD DNA Repository may not, in reality, be as strictly limited as the military contends. Potentially, a third-party employer could illegally gain access to computerized files, with a mere 1% risk of detection. In addition, a third-party could access records on her own and sell the information to potential employers, or an authorized user could leak information from the DNA Repository to possible employers. Such problems are only likely to arise, however, if the genetic information contained in the DoD DNA Repository stored electronically in the future. If the government takes no such action, the potential harm to service members is minimal. In addition, even if genetic information is electronically stored, hacking into the DoD's database is an illegal activity. One would suspect that employers would not engage in such activities, even if the chances of being detected are small, since harsh punishment upon detection is certain. The possibility that an employer might purchase genetic information stolen from the DoD DNA Repository might be more realistic, but is no less speculative. As a result, one must conclude that the possibility that a civilian employer could use the information contained in the DoD DNA Repository to discriminate against a service member, though it exists, is rather low.

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n326. See Jefferson, supra note 304.

n327. See Lais, supra note 323, at 49. (Information brokers pay other hackers to steal information, then they resell it.). This may have already happened, being that illegal entry into DoD files is undiscovered 99% of the time. See Jefferson, supra note 304; see also Michael Landau, Use of Genetic Testing by Employers and Insurance Companies, 3 Dick. J. Envtl. L. & Pol'y 105 (1994) (imagining that some sort of insider trading in genetic information could arise in the future).

n328. See generally Allen, supra note 300. At present, there exists a black market for medical information in which just about any person's medical records can be purchased for approximately \$250. See id. Leaking of medical information is particularly problematic because security measures apparently cannot prevent it from happening. See id.

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B. The Military as Employer\par

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The military is one of the largest employers in the nation,ⁿ³²⁹ and its health system is one of the largest in the world, covering more than eight million individuals.ⁿ³³⁰ As such, the DoD spends thirty-two billion dollars each year for health care costs, a financial burden greater than that borne by any private employer in the United States.ⁿ³³¹ Providing health care has been particularly difficult for the military because, while health care costs increase, the DoD's budget has been targeted for cuts since the end of the Cold War.ⁿ³³² Officials at the Pentagon indicated that diminishing military resources have affected nearly every aspect of military performance,^{\22}from cuts in training to shortages of parts for fighter jets to the gap between military and civilian pay.^{\22} ⁿ³³³ As a result, officials fear that the ability of the military to engage in and win a war, what is commonly referred to as ^{\22}military readiness,^{\22} could be compromised.ⁿ³³⁴\par

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ⁿ³²⁹. See generally William N. Eskridge, Jr. & Monica Gallagher, Symposium, The Tools of Title VII Enforcement, Then and Now, *16 Pac. L.J.* 791, 799 (1995).\i0 \par\par

ⁿ³³⁰. See Rudy de Leon, Funding for Defense Health Programs, Congressional Testimony, Sept. 24, 1998, available in *1998 WL 18088653*.\i0 \par\par

ⁿ³³¹. See Vets' Panel Key Findings, *USA Today*, Jan. 14, 1999, at 12A; Bill McCaillister, More Aid to Veterans Urged; Panel Says College Should Be Free, *Chi. Sun-Times*, Jan. 15, 1999, at 29. It would cost \$462 million over a five year period to finance these additional health care services. See *id.* See generally de Leon, *supra* note 330. Recently, a Congressionally appointed committee proposed that the Pentagon pay health care costs for military personnel and their families for up to eighteen months after personnel are discharged. \par\par

ⁿ³³². See generally Steven Lee Myers, Military Feeling Budget Crunch, Clinton Warned, Brass Tells Him of Shortages, Pay Gap, *San Diego Union-Trib.*, Sept. 16, 1998, at A1. \par\par

ⁿ³³³. *Id.* \par\par

ⁿ³³⁴. See *id.* \par

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Cutting military health care costs could provide additional funds for the military to improve its overall readiness. The military's financial incentives to eliminate or exclude service members who could become susceptible to genetic disease are thus similar to the incentives of third-party employers.ⁿ³³⁵ However, in addition to this financial motive, the military possesses the means by which such adverse selection could be carried out - the genetic records of every service member in the Marines, Air Force, Army, and Navy. Through genetic screening, the military could eliminate individuals who are prone to the development of genetically-linked diseases, thus taking preventative measures to control health care costs.ⁿ³³⁶\par

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n335. See Allen, supra note 300, at 10-11. \par\par

n336. See Gill, supra note 12, at 210 ('The military could conceivably use its DNA registry to identify members who might have health risks or who might develop diseases rendering them no longer physically qualified'). \par\par

Screening would also serve another military purpose - that of military effectiveness. By excluding individuals who may be more prone to illness, the military could select a physically superior fighting force. \par

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No federal law prevents the U.S. military from engaging in such genetic discrimination against a '5B*1022'5D uniformed service member because courts have continually refused to extend statutory remedies available to civilians to uniformed members of the armed forces without direction from Congress to do so. n337 Thus, the Rehabilitation Act, the Americans with Disabilities Act, and Title VII of the Civil Rights Act offer service personnel no protection from discriminatory action taken by the military.\par

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n337. See *vi Coffman v. Michigan*, 120 F.3d 57 (6th Cir. 1997);*vi Doe v. Garrett*, 903 F.2d 1455 (11th Cir. 1990);*vi Milbert v. Koop*, 830 F.2d 354 (D.C. Cir. 1987);*vi Roper v. Department of the Army*, 832 F.2d 247 (2d Cir. 1987);*vi Gonzalez v. Department of the Army*, 718 F.2d 926 (9th Cir. 1983);*vi Johnson v. Alexander*, 572 F.2d 1219 (8th Cir. 1977).\i0 \par

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Section 2000e(b) of Title VII defines employer as any 'person engaged in an industry affecting commerce who has 15 or more employees for each working day in each of 20 or more calendar weeks.' n338 However, the military is not recognized as an employer amenable to suit brought under Title VII by a uniformed service member. n339 Rather, suits brought by uniformed members of the armed services fall under the general 'military exception' grounded in *vi 42 U.S.C. 2000e-16*,*vi0* which states: 'All personnel actions affecting employees or applicants for employment... in military departments as defined in 102 of Title 5... shall be made free from any discrimination based on race, color, religion, sex or national origin.' n340\par

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n338. *vi 42 U.S.C. 2000e**vi0* (b) (1994). \par\par

n339. See *vi Hodge v. Dalton*, 107 F.3d 705 (9th Cir. 1997);*vi Doe v. Garrett*, 903 F.2d 1455 (11th Cir. 1990);*vi Roper v. Department of the Army*, 832 F.2d 247 (2d Cir. 1987);*vi Taylor v. Jones*, 653 F.2d 1193 (8th Cir. 1981).\i0 \par\par

n340. *vi 42 U.S.C. 2000a-16**vi0* (1994); see also *vi Gonzalez v. Dept. of the Army*, 718 F.2d 926, 928 (9th Cir. 1983)*vi0* ('Neither Title VII nor its standards are applicable to persons who enlisted or apply for enlistment in any of the armed forces of the United States.').*vi Johnson v. Alexander*, 572 F.2d 1219, 1224 (8th Cir. 1978).\i0 \par

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The question regarding whether uniformed members of the military service may bring suit against the government under Title VII for any employment related discrimination focuses upon the interpretation of the words 'employees... in military departments' found in the above-mentioned section. In *Johnson v. Alexander*, the Eighth Circuit held that an applicant for enlistment in the armed services could not bring suit under Title VII.³⁴¹ In so deciding, the Court emphasized that uniformed members of the armed services differ from ordinary civilian employees in the military,³⁴² mentioning that an enlisted service member cannot quit his job, that the armed services cannot simply fire a service member, and that the service member is subject to both military discipline and military law.³⁴³ The Court concluded that uniformed service members would not be considered 'employees... in military departments,' but that phrase would be construed to include civilian employees in the military.³⁴³

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³⁴¹. 572 F.2d 1219 (8th Cir. 1978).

³⁴². See *id.* at 1223-24.

³⁴³. *Id.*

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The Ninth Circuit reached a similar conclusion in *Gonzalez v. Department of Army* by focusing on the statutory definition of military departments.³⁴⁴ Section 102 of Title 5, referred to in Section 2000e-16 of Title VII, defines military departments as: 'The Departments of the Army'; 'The Department of the Navy'; and 'The Department of the Air Force.'³⁴⁵ Section 101 of Title 10,³⁴⁶ as referenced in the historical and revision note to 5 U.S.C.

102,³⁴⁷ contains a definition of military departments substantially similar to that found in 5 U.S.C. 102.³⁴⁸ However, section 101 also provides a distinct definition for 'armed forces,' stating that 'Armed Forces' means the Army, Navy, Air Force, Marine Corps, and Coast Guard.³⁴⁹ The Court concluded that because Congress used separate definitions for military departments and armed forces, Congress intended that the former refer to a department consisting of civilian employees, while the latter is a body consisting of uniformed military personnel.³⁵⁰ The 'military departments' language in Title VII therefore applies solely to civilian employees in military departments, rather than to any uniformed service members seeking to bring a Title VII cause of action against the government.

³⁵⁰ Thus, no uniformed member of the armed forces could bring a claim against the military under Title VII for use of genetic information in a manner which disparately impacts individuals of a particular race, sex, religion, or national origin.

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³⁴⁴. 718 F.2d 926 (9th Cir. 1983).

³⁴⁵. 5 U.S.C. 102 (1994).

³⁴⁶. 10 U.S.C. 101 (7) (1994).

³⁴⁷. 5 U.S.C. 102 (1994).

³⁴⁸. 10 U.S.C. 101 (4) (1994).

³⁴⁹. See *Gonzalez*, 718 F.2d at 928.

³⁵⁰. *Id.*

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\5B*1024\5D The courts' refusal to allow uniformed service members to bring a cause of action against the military under the Rehabilitation Act or the Americans with Disabilities Act is an extension of the rationales found in Johnson and Gonzalez, n351 as well as reasoning utilized by the Supreme Court in Chappell v. Wallace. n352 In Chappell, the Court held that soldiers could not bring a Bivens n353 action against their superiors for damages stemming from alleged racial discrimination in violation of their constitutional rights. n354 The Court noted that: \22The special status of the military has required, the Constitution has contemplated, Congress has created, and this court has long recognized two systems of justice, to some extent parallel: one for civilians and one for military personnel.\22 n355 Since Congress has plenary authority over the military, any interference by the judiciary with matters connected to military life would be inappropriate. n356 So, just as courts declined to extend a remedy to uniformed members of the armed forces for discrimination on the basis of sex, race, religion, or national origin absent authorization by Congress, n357 courts likewise refused to allow uniformed service members to bring claims under the Rehabilitation Act or the Americans with Disabilities Act for discrimination on the basis of disability. n358\par

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n351. \i Coffman, 120 F.3d at 59.\i0 \par\par
n352. \i 462 U.S. 296.\i0 \par\par
n353. \i Bivens v. Six Unknown Named Agents of Federal Bureau of Narcotics, 403 U.S. 388 (1971)\i0 (holding that governmental employees may be sued in their individual capacity). \par\par
n354. See \i Chappell, 462 U.S. at 303-04.\i0 \par\par
n355. \i Id. at 303-04.\i0 \par\par
n356. See \i id. at 304.\i0 See \i Coffman, 120 F.3d at 59,\i0 for a discussion of the Chappell case, as it relates to the denial of a remedy for uniformed members of the armed forces under Title VII, the Rehabilitation Act, and the Americans with Disabilities Act. \par\par
n357. See notes 341-50 and accompanying text. \par\par
n358. See \i Coffman, 120 F.3d at 59\i0 (holding that a national guard member released from military service due to his inability to complete a two-mile run within the time required by Army fitness standards had no remedy for disability discrimination under the Americans with Disabilities Act or Rehabilitation Act since he was a uniformed member of the armed forces); \i Garrett, 903 F.2d at 1461\i0 (holding that an asymptomatic HIV-positive naval reserve member had no cause of action under the Rehabilitation Act for disability discrimination since the Rehabilitation Act doesn't apply to uniformed military personnel); \i Smith, 763 F.2d at 1325\i0 (holding that an applicant for a commission as an officer in the U.S. Naval Reserve, Medical Service Corps, could not bring an action under the Rehabilitation Act for disability discrimination on the basis of a missing right index finger). \par

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\5B*1025\5D Without any laws to proscribe genetic discrimination, no legal deterrent exists to prevent the military from engaging in discriminatory acts. To the contrary, the military is one of the few employers in the United States.

es who may engage in discriminatory practices with little or no interference from the judiciary. n359 This situation exists because the United States Constitution grants Congress express authority to '22raise and support Armies... , to provide and maintain a Navy... to make Rules for the Government and Regulation of the land and naval Forces.'22 n360 In addition to recognizing Congressional authority over the military, many courts are reluctant to interfere with the '22 '22strong historical' tradition supporting '22the military establishment' s broad power to deal with its own personnel' '22 since they consider themselves incapable of acting in a realm dominated by military experts. n361 As a result, courts give great judicial deference to Congress when addressing military rules or policies. n362\par

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n359. See Melissa Wells-Petry, *Exclusion: Homosexuals and the Right to Serve* 5 (1993); Sam Nunn, *The Fundamental Principles of the Supreme Court's Jurisprudence in Military Cases*, 1995 *Army Law* 27, 28.\i0 \par\par

n360. U.S. Const. Art. I, 8, cl. 12-14. \par\par

n361. John A. Carr, *Free Speech in the Military Community: Striking a Balance Between Personal Rights and Military Necessity*, 45 *A.F. L. Rev.* 303, 309\i0 (quoting Earl Warren, *The Bill of Rights and the Military*, 37 *N.Y.U. L. Rev.* 181, 187 (1962)).\i0 The courts' '22hands-off'22 attitude when dealing with the military was expressed in *Orloff v. Willoughby*, 345 U.S. 83 (1953),\i0 when the Court stated: \par\par

Judges are not given the task of running the Army.... The military constitutes a specialized community governed by a separate discipline from that of the civilian. Orderly government requires that the judiciary be as scrupulous not to interfere with legitimate Army matters as the Army must be scrupulous not to intervene in judicial matters. \par\par

\i Id. at 93-94.\i0 Similarly, the court stated in *Gilligan v. Morgan*, 413 U.S. 1 (1973),\i0 \par\par

It is difficult to conceive of an area of governmental activity in which the courts have less competence. The complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject always to civilian control of the Legislative and Executive Branches. \par\par

\i Id. at 10.\i0 See also *Chappell v. Wallace*, 462 U.S. 296, 305 (1983);\i0 \i Goldman, 475 U.S. at 507.\i0 \par\par

n362. See Kathryn R. Burke, *The Privacy Penumbra and Adultery: Does Military Necessity Justify an Adultery Regulation and What Will It Take for the Court to Declare It Unconstitutional?*, 19 *Hamline J. Pub. L. & Pol'y* 301, 321 (1997);\i0 see also Simmons, *supra* note 13, at 26. \par

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'5B*1026\5D The military thus may adopt practices on the basis of military necessity even though such practices would be considered discriminatory if engaged in by employers in the private sector in absence of business necessity. n363 As explained by author Melissa Wells-Petry, a Major in the U.S. Army,\par

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n363. See e.g. *Goldman v. Weinberger*, 475 U.S. 503 (1986)\i0 (holding th

at the military may refuse to alter uniform dress regulations to allow the wearing of a yarmulke because military necessity outweighs protections available under the Free Exercise Clause of the First Amendment); *Doi v. Garrett*, 903 F.2d 1455 (11th Cir. 1990) (upholding military exclusion for HIV seropositivity); *Smith v. Christian*, 763 F.2d 1322 (11th Cir. 1985) (holding that the exclusion of an applicant from military service because he lacked a finger was permissible); *Blameuser v. Andrews*, 630 F.2d 538 (7th Cir. 1980) (upholding exclusion of cadet from Reserve Officer Training Corps for adherence to nazism); *Williams v. United States*, 541 F. Supp. 1187 (E.D.N.C. 1982) (upholding discharge of Marine for being weighing fifty pounds more than military weight standards). \par

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all military personnel policies discriminate.... For example, the military excludes - 'discriminates against' - single parents, felons, handicapped individuals, transsexuals, conscientious objectors, and persons with any of a number of medical conditions. The military also discriminates on the basis of height and weight, physical and mental ability, visual acuity, political beliefs and religious affiliation, language, youth and age. To repeat - all military personnel policies discriminate.... And these discriminatory judgments are made by Congress, by the Secretary of Defense, or by the service secretaries in fulfilling their duty to compose strong, combat-ready, and efficiently administered armed forces. n364\par

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The military developed these restrictions to improve 'overall combat effectiveness.' n365 The circumstances which the restrictions target are not linked to the ability of military personnel to perform any job in particular n366 and need not be tailored as such due to the courts' 'extreme deference to the military bordering on non-justiciability....' n367 Provided that the military argues the existence of military necessity, whether due to the need for '5B *1027'5D preparedness or the need to maintain discipline, courts will refrain from passing judgment upon military practices. n368\par

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n364. Wells-Petry, *supra* note 359, at 5. See also Nunn, *supra* note 359, at 28 ('The armed forces routinely restrict the opportunities for service on the basis of circumstances such as physical condition, age, sex, parental status, educational background, medical history, and mental aptitude.'). \par\par

n365. Nunn, *supra* note 359, at 28. \par\par

n366. See *id.* \par\par

n367. C. Thomas Dienes, *When the First Amendment Is Not Preferred: The Military and Other 'Special Contexts'*, 56 U. Cin. L. Rev. 779 (1988). \par\par

n368. See e.g., *Parker v. Levy*, 417 U.S. 733, 758 (1974) ('The fundamental necessity for obedience, and the consequent necessity for imposition of discipline, may render permissible within the military that which would be constitutionally impermissible outside it.'). See generally Burke, *supra* note 362, at 332; Dienes, *supra* note 367, at 799. \par

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Many of the restrictions which the military imposes upon service personnel are in fact justified by military necessity. Indeed, when national defense is at issue, military necessity dictates that individuals in combat positions can perform physical tasks such as being able to carry weapons or injured peers. Some military restrictions, however, may in reality be based more upon military preference than military necessity. For example, since the First World War, the military has used personnel regulations and military laws proscribing sodomy to prevent homosexuals from serving in the military. n369 In 1993, President Clinton's '22Don't Ask, Don't Tell'22 policy created a system in which any service member who engages in, or attempts or intends to engage in, homosexual acts shall be discharged from the armed forces. n370 In addition, individuals who indicate that they are homosexual are discharged from the military unless they rebut the presumption that they will engage in homosexual acts while in the military. n371 The military necessity upon which this policy is founded is usually described as the necessity of maintaining unit cohesion. n372 Army Chief of Staff General Gordon R. Sullivan announced this concern in 1993: '22cohesion is enhanced by uniformity, by adherence to a common sense of values and behavior. The introduction into any small unit of a person whose open orientation and self-definition is diametrically opposed to the rest of the group will cause tension and disruption.'22 n373 However, a RAND '5B*1028'5D study conducted at the request of the Secretary of Defense and completed in 1993 revealed that, although senior military leaders expressed great fear that unit cohesion would be ruined by the allowance of homosexuals in the military, any disruption of unit cohesion was likely to be minimal. n374 Thus, it would appear that the military necessity of maintaining unit cohesion may not truly justify military policies against homosexuals. Nevertheless, courts which have been asked to address the '22Don't Ask, Don't Tell'22 policy have deferred to Congress for reasons previously explained rather than examining the military's rationale. n375\par

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n369. See RAND National Defense Research Institute, Sexual Orientation and U.S. Military Personnel Policy: Options and Assessment 3 (1993) '5Bhereinafter RAND Study'5D. \par\par

n370. See 10 U.S.C. 654 (Supp. 1994); see also Henry Weinstein, Appeals Court Backs Military Policy, Upholds Discharge of Two Gay Men, L.A. Times, Sept. 6, 1997, at A25. \par\par

n371. See id. \par\par

n372. See Elizabeth Kier, Homosexuals in the U.S. Military: Open Integration and Combat Effectiveness, 23 Int'l Security 5 (1998). \par\par

n373. See id. at 5. For a more extensive discussion of unit cohesion, see RAND Study, supra note 369, at 283-329. \par\par

n374. See RAND Study, supra note 369, at 329-30. Examiners based this conclusion upon analysis of unit cohesion in fire departments, police departments, and foreign militaries in which homosexuals were allowed to serve. See id. \par\par

n375. See e.g., Able v. United States, 155 F.3d 628, 636 (2d Cir. 1998) (reversing a district court holding that one section of 10 U.S.C. 654 was unconstitutional and emphasizing that the court could not substitute its own judgment for that of Congress). \par

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The U.S. military used an argument of military necessity to maintain racial discrimination in the armed forces. n376 Throughout the early part of the twentieth century, a number of military leaders held the opinion that the elimination of racial segregation in the military would jeopardize unit cohesion and performance. n377 Opponents to integration argued that it would 'create personal tensions and social divisions that would distract military personnel, disrupt work, and perhaps lead to violence.... 'It would' undermine unit cohesion among the troops and thereby impair their morale, readiness, and ability to perform as a unified combat force.' n378 Interestingly, it was the true military necessity in the winter of 1944-1945 due to infantry troop shortages in Europe that arose which caused General Eisenhower to order integrated combat training for black and white service members. n379 Field reports indicated that neither racial violence nor lack of cooperation arose in integrated combat situations. n380\par

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n376. See RAND Study, supra note 369, at 20. \par\par

n377. See id. at 171. \par\par

n378. Id. at 172. \par\par

n379. See id. at 173. \par\par

n380. See id. \par

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The fact that the United States military has used the concept of military necessity to justify discriminatory '1029' practices in instances when no necessity exists raises the question whether the military might use DNA Repository records to engage in genetic discrimination on the basis of 'military necessity.' The denial of Title VII protections for service members and judicial deference to Congress regarding military rules and policies create a situation in which the military is granted license to discriminate. In addition, the military has engaged in genetic discrimination in the past when dealing with the sickle cell trait. n381\par

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n381. See David Suzuki & Peter Knudtson, Genethics: The Ethics of Engineering Life 145 (1990); Richard Severo, Air Academy to Drop its Ban on Applicants with Sickle-Cell Gene, New York Times, Feb. 4, 1981, at A1; Dean, supra note 3, at 23. \par

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Sickle cell disease is a term used to describe a family of inherited red blood cell disorders which include sickle cell anemia, sickle cell disease, and sickle 'beta' Thalassaemia n382 and which predominantly appear among individuals of African descent. n383 A person with sickle cell disease is at risk of suffering a medical crisis in which her red blood cells 'sickle' by distorting into a crescent shape. n384 When this occurs, the misshapen cells can block the flow of blood through small blood vessels, thereby causing oxygen deprivation and tissue damage in some organ systems. n385 However, the disease will manifest itself only if an individual inherits the genetic trait for sickle cell

anemia from both parents. n386 In 1994, approximately 60,000 individuals in the United States possessed sickle cell disease. n387\par

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n382. See Kenny Midence & James Elander, Sick Cell Disease: A Psychosocial Approach 5 (1994). \par\par

n383. See Sick Cell Disease Research: An Update: Hearing of the Senate Comm. on Labor and Human Resources, 103d Cong. 39 (1994) \5Bhereinafter Sick Cell Disease Hearing\5D; Douglas Birch, Genetic Tests Forecast Onset of Inherited Medical Disorders, Austin-American Statesman, May 20, 1995, at E5. \par\par

n384. See Midence & Elander, supra note 382, at 5. \par\par

n385. See id. \par\par

n386. See Birch, supra note 383, at E5; Air Force Academy Sued Over Sick Cell Policy, New York Times, Jan. 4, 1981, at 20 \5Bhereinafter Academy Sued\5D. \par\par

n387. See Sick Cell Disease Hearing, supra note 383, at 39. \par

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If an individual inherits a single sickle cell gene from a parent, he will develop sickle cell trait rather than sickle cell disease, n388 and will not ordinarily experience any sickling crisis. n389 Sickle cell trait is not a disease; carriers of \5B*1030\5D the trait do not require treatment for this trait, nor will they develop medical problems related to the trait as they age. n390 In other words, most carriers of this genetic trait are completely asymptomatic and remain so throughout their lives since a majority of their red blood cells function normally. n391 However, sickling can occur under certain extreme conditions, such as strenuous physical exercise at a high altitude or flying at a high altitude in an unpressurized plane. n392 Approximately 2.5 million people in the United States have this \22healthy carrier\22 type of sickle cell. n393\par

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n388. See Midence & Elander, supra note 382, at 14; Birch, supra note 383, at E5. \par\par

n389. See Gostin, supra note 163, at 118; Birch, supra note 383, at E5 (\22\5BA\5D few people with the trait have an elevated risk of developing blood clots in the leg and elsewhere. But 98 percent of people with the single gene suffer no health effects.\22); Richard Severo, Air Academy to Drop Its Ban on Applicants With Sickle-Cell Gene, New York Times, Feb. 4, 1981, at A1 (stating that the trait is \22generally regarded as harmless\22). But see Susan Okie, Sickle-Cell Trait Poses Exertion Risk: Increase in Chance of Sudden Death Seen, The Washington Post, Sept. 24, 1987, at A3. \par\par

n390. See Midence & Elander, supra note 382, at 14. \par\par

n391. See Suzuki & Knudtson, supra note 381, at 144. \par\par

n392. See id. at 145. \par\par

n393. See Sick Cell Disease Hearing, supra note 383, at 39. \par

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In 1972, two black cadets at the Air Force Academy became ill after undergoing survival training at elevations of over 7000 feet. n394 The Air Force linked

the cadets' illness to the fact that they possessed the sickle cell trait, n395 and feared that carriers of the sickle cell trait might have reduced oxygen-carrying ability when flying at high altitudes during pilot training. n396 This event spurred the Air Force Academy to implement a policy under which every applicant possessing sickle cell trait would be denied admittance to the Academy, n397 despite the fact that the Air Force did not at that time have 'adequate scientific evidence to substantiate its concerns.' n398 The exclusionary policy was enacted in 1973 and maintained for eight years. n399 In 1981, the Air Force Academy finally decided to drop the ban after 'more and more medical knowledge became available' to indicate that the policy was really not justified by available scientific facts. n400

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n394. See Severo, supra note 389, at A1. \par\par

n395. See id. \par\par

n396. See Suzuki & Knudtson, supra note 381, at 145. \par\par

n397. See Severo, supra note 389, at A1. \par\par

n398. Suzuki & Knudtson, supra note 381, at 145. \par\par

n399. See id.; Severo, supra note 389, at A1; Chadwin, supra note 2, at 23.

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n400. Chadwin, supra note 2, at 23.. \par

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\5B*1031\5D The Academy's sickle cell trait policy disproportionately affected black students because both sickle cell disease and the sickle cell trait occur predominantly among individuals of African descent. n401 In fact, approximately five incoming black cadets were excluded from the Academy during each year that the policy was in effect. n402 Since possession of a genetic trait does not predict any current or future illness, the Air Force Academy was excluding individuals based upon the manner in which their genetic map differed from the 'normal' genome, n403 thereby engaging in genetic discrimination.

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n401. See generally Gill, supra note 12, at 201; Gostin, supra note 163, at

139. \par\par

n402. See Academy Sued, supra note 386, at 20. \par\par

n403. See Billings, et al., supra note 167, at 477. \par

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Such genetic discrimination in the military could foreseeably happen again. If it did occur, no uniformed member of the armed forces could successfully bring an action against the military under Title VII, the Rehabilitation Act, or the Americans with Disabilities Act. n404 This absence of protection against discrimination for service members, in combination with the history of discrimination in the Armed Forces, suggest that Mayfield and Vlacovsky's fears regarding the potential for discriminatory action by the military through adverse use of information contained in the DoD DNA Repository may be a valid concern. The potential for harm does exist. Although the chances that such harm will actually occur may be labeled by a court as a 'speculative contingency,' this conti

agency may not be more speculative than the interest which military has in the identification of human remains through DNA analysis. n405\par

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n404. See supra notes 195-259 and accompanying text. \par\par

n405. See supra notes 105-52 and accompanying text. \par

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Conclusion\par

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The DoD's policy of mandatory DNA collection is one which is likely to be challenged again. Before this happens, it is essential that Congress expand the coverage of the civil rights laws to include the prohibition of genetic discrimination, that states continue to pass laws proscribing genetic discrimination in employment, and that Congress adopt a new policy which would allow the \5B*1032\5D judiciary to examine the necessity of mandatory DNA collection from all service members and recruits. \par\par

In applying the Skinner balancing test, the District Court of Hawaii examined whether the government possessed a compelling interest in the identification of remains in general. Once this broad category was selected, the court's conclusion was foregone - the fact that the government has a compelling interest in the identification of remains is undisputed. However, the issue which should have been addressed in Mayfield and must be addressed by the legislature is whether the DoD has a compelling interest in the identification of remains by DNA analysis when the DNA is obtained through a mandatory collection policy. \par\par

By failing to examine the government's necessity, the District Court of Hawaii failed to discover that the government does not possess a compelling interest in the mandatory collection of DNA from service members because it did not consider any of the following factors: (1) that the United States is enjoying a time of peace during which a service member's estimated chances of survival are 99.998%, n406 (2) that traditional means of remains identification are still viable, n407 (3) that contaminated DNA can lead to misidentification or render positive identification impossible, n408 and (4) that DNA identification could be carried out by using DNA voluntarily supplied by family members of the deceased. n409 In addition, when the court took up the other half of the Skinner test, and examined the degree of intrusion upon the marines' privacy rights, any of Mayfield's and Vlacovsky's fears regarding future discriminatory action were labeled nonjusticiable and hastily set aside. n410 First, the District Court never explored the likelihood that genetic information catalogued in the DNA Repository could be used by private sector employers for adverse purposes. It is true that such a discussion would call for speculation. However, the speculative contingencies of future genetic discrimination may not be nearly as speculative as portrayed by the \5B*1033\5D District Court of Hawaii. Moreover, when compared to the military's actual need to use the DNA it collects and stores for identification purposes, the actual necessity of the government to collect and store DNA sample of every service member may be even more speculative than the possibility of harm to service members. Computer records in the DoD DNA Repository are not fully secured against unauthorized entry. n411 If genetic information is stored electronically and improperly accessed, employers of service members or former service members are only precluded from using genetic information in employment decisions in fourteen states. n412 No federal legislation speci

fically proscribes genetic discrimination. n413 A potential for harm exists and merits consideration.\par

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n406. See supra Part III.A. \par\par

n407. See supra Part III.B. \par\par

n408. See supra Part III. C. \par\par

n409. See supra Part III. D. \par\par

n410. See \i Mayfield v. Dalton, 901 F. Supp 300, 304 (D. Haw. 1995).\i0 \par\par

n411. See supra Part III.A.6. \par\par

n412. See supra Part III.A.4. \par\par

n413. See supra Parts IV.A.1 to A.3. \par

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Secondly, and more importantly, the military as employer engages in discriminatory practices. n414 Service members are barred from bringing employment discrimination claims against the government under Title VII, the Rehabilitation Act or the ADA. n415 If it wished, the military could foreseeably initiate a program of genetic screening to control increasing health care costs and justify such discrimination by claiming that it is dictated by military necessity. The potential for harm exists.\par

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n414. See supra Part IV.B. \par\par

n415. See supra notes 338-59 and accompanying text. \par

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When the Human Genome Project is complete, project participants expect that all three billion bases in the human genome will be identified. n416 \22The more genes that can be identified and understood - the higher the resolution of the map - the clearer the steps to prevention or cure. But by the same token, the more information that genes yield to... employers, the more they can make people vulnerable to discrimination.\22 n417 The DoD DNA Registry is expected to contain over 2.5 million specimens by 2001, n418 any one of which could be improperly accessed. Until adequate \5B*1034\5D safeguards are implemented by Congress, service members are in fact vulnerable to discrimination.\par

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n416. See Advances in Genetics Research and Technologies: Challenges for Public Policy: Hearings Before the Senate Committee on Labor and Human Resources, 104th Cong. 46 (1995) (testimony of Francis S. Collins, M.D.). \par\par

n417. Allen, supra note 300, at 35. \par\par

n418. Simmons, supra note 13, at 35 (stating that approximately 2.5 million service members are in the military each year, and the turn-over rate in the military is 200,000 to 300,000 individuals per year). \par

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LENGTH: 68776 words \par\par\pard

ARTICLE: Sex, Culture, and the Biology of Rape: Toward Explanation \par
and Prevention \par\par\pard
Owen D. Jones* \par\par\pard

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SUMMARY: ... For all that has been written about rape, its multiple causes remain insufficiently understood for law to deter it effectively. ... Less known is that efforts to understand rape in humans as a phenomenon unique to human culture have long been paralleled by the efforts of biologists and animal behaviorists to understand widespread male-female sexual aggression among many other species. ... For example, if eager pursuit of possible sex partners on average increases reproductive success, and if such pursuit occasionally results in nonconsensual sex (even at some cost to the raping male) then rape behavior could be a by-product of a psychology evolved by direct selection to pursue eagerly, and persist in obtaining, possible sex partners. ... Why is rape overwhelmingly a male rather than female behavior in all species in which it is observed? If evolutionary processes had no influence whatsoever, we would expect greater variability. ... Observable patterns in existing rape data illuminated by biobeh

avioral theory, such as the striking parallel between risk of rape victimization and the female fertility curve, make this conclusion highly suspect. ... In Illinois, for example, the victim's age at the time of rape (criminal sexual assault) has potentially serious consequences for the rapist's sentence.

...
TEXT: \5B*829\5D

For all that has been written about rape, its multiple causes remain insufficiently understood for law to deter it effectively. This follows, Professor Jones argues, from inadequately interdisciplinary study of rape causation. Specifically, integrating life science and social science perspectives on sexual aggression can improve law's model of rape behavior, and further our efforts to reduce its incidence. This Article first explains biobehavioral theories of sexual aggression, and offers a guide to common but avoidable errors in assessing them. It then compares a number of those theories' predictions with existing data and demonstrates how knowledge of the effects of evolutionary processes on human behavioral predispositions may help us better understand - without justifying or excusing - psychological mechanisms that contribute to patterns of rape. Because increased knowledge of causal influences may afford law increased effectiveness in deterring rape, the author then explores ways in which biobehavioral theories could affect analysis of several current legal issues, from the debate over chemical castration to the meaning of motive in rape-relevant legislation.

Theories of causation are important because they beget strategies for prevention.

-----Footnotes-----
1. Diana Scully, Understanding Sexual Violence: A Study of Convicted Rapists 53 (1990).

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Rape is a serious and too-frequent crime, worthy of our most concerted efforts to curb its incidence. Not only does it harm the subordinated victim, those who care about her, and those whose fear of rape is increased by her rape, but it also injures society, which loses the full participation of those women who alter their behavior as a function of fear. Rape contributes to a social, emotional, and political environment in which women's bodies, lives, experiences, and realities are improperly restrained. It has meanings at the deepest level of human symbolism, and serves as an excruciating reminder of how a culture that disinhibits the aggressive exercise of power fosters callous oppression at the cost of female autonomy.

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2. While rape has many other important manifestations, such as male-male, female-male, and female-female violations, in this Article I am concerned primarily

ily with rape involving male-female penile-vaginal penetration. For a careful analysis of the effects and costs of female fear of rape, see Margaret T. Gordon & Stephanie Riger, *The Female Fear* (1989). See also Robin L. West, *The Difference in Women's Hedonic Lives: A Phenomenological Critique of Feminist Legal Theory*, 3 *Wis. Women's L.J.* 81, 94 (1987) (exploring how women reconstitute themselves in response to the fear of male violence).

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The long history of the law's treatment of rape is a well-chronicled embarrassment, even tragedy. n3 Against this, feminist writings have argued successfully for a plethora of improvements in the substance and procedure of rape law. n4 And yet for all the volumes written about rape, and all the claims that have been made to have captured, categorized, and extracted its very essences, rape reforms have had far less impact than hoped. n5 Rape remains a mystery - insufficiently understood to be effectively prevented. n6 For every claim that rape is surely about violence, and not about sex, we hear a claim that rape is surely about sex, even if it is also about violence. For every argument that rapists are imbalanced and mentally infirm, there is an argument that the true rapist is an Everyman, an omnipresent threat.

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n3. See, e.g., Susan Estrich, *Real Rape* (1987) (providing a detailed examination of rape law); Deborah L. Rhode, *Justice and Gender* 244-53 (1989) (discussing weaknesses of law's earlier approaches); Stephen J. Schulhofer, *Unwanted Sex: The Culture of Intimidation and the Failure of Law* (1998).

n4. Substantive changes include, for example, the elimination of demonstrated nonconsent as an element of the offense. Procedural and evidentiary changes include, for example, shielding the victim's prior sexual history. See Donald A. Driggs, *Beyond Rape: An Essay on the Difference Between the Presence of Force and the Absence of Consent*, 92 *Colum. L. Rev.* 1780, 1780-85 (1992) (discussing transformation of rape law). See generally Keith Burgess-Jackson, *Rape: A Philosophical Investigation* 67-86 (1996); Cassia C. Spohn & Julie Horney, *Rape Law Reform: A Grassroots Revolution and Its Impact* (1992); Cassia C. Spohn, *The Rape Reform Movement: The Traditional Common Law and Rape Law Reforms*, 39 *Jurimetrics J.* 119, 120-29 (1999).

n5. Reformers expected that rape reports, arrests, convictions, and imprisonment would all increase. See Ronet Bachman & Raymond Paternoster, *A Contemporary Look at the Effects of Rape Law Reform: How Far Have We Really Come?*, 84 *J. Crim. L. & Criminology* 554, 555 (1993); Cassia C. Spohn & Julie Horney, *Criminology: The Impact of Rape Law Reform on the Processing of Simple and Aggravated Rape Cases*, 86 *J. Crim. L. & Criminology* 861, 862 (1996). But although reforms are generally credited with prompting significant changes in the public attention to, and discussion of, legal issues surrounding rape, see, e.g., Leigh Bienen, *Rape Reform Legislation in the United States: A Look at Some Practical Effects*, 8 *Victimology: Int'l J.* 139, 148 (1983), researchers have generally concluded that, except in a handful of jurisdictions, legal reforms have not significantly increased either rape reporting or the probabilities of arrests and convictions for rape. See, e.g., Schulhofer, *supra* note 3, at ix ('2000 laws against rape still fail to protect women'); Bachman & Paternoster, *supra*, at 556, 573 (claiming rape statute reform 'has not had a very substantial effect on either victim behavior or actual practices in the criminal justice system'); Julie Horney & Cassia C. Spohn, *Rape Law Reform and Inst*

strumental Change in Six Urban Jurisdictions, 25 L. & Soc'y Rev. 117, 149-50 (1991) ('22\5BThere is an\5D overall lack of impact of rape law reforms <Elip> We have shown that the ability of rape reform legislation to produce instrumenta l change is limited.\22). For a recent discussion of aspects of reform aimed a t redefining the elements and crime of rape, see David P. Bryden, Redefining Ra pe, Buff. Crim. L. Rev. (forthcoming 1999). See also Bienen, supra, at 148 (dis cussing effects of New Jersey rape reforms on incarceration rates as insignific ant); Carol Bohmer, Acquaintance Rape and the Law, in Acquaintance Rape: The Hi dden Crime 317, 326 (Andrea Parrot & Laurie Bechhofer eds., 1991) ('22Many of these reforms have had limited effect on the experience of the victim or the li kelihood \5Bof\5D conviction.\22); David P. Bryden & Sonja Lengnick, Rape in the Criminal Justice System, \i 87 J. Crim. L. & Criminology 1194, 1283-94 (19 97)\i0 (discussing disjunction between hopes of reformers and effects of refor ms); Morrison Torrey, Feminist Legal Scholarship on Rape: A Maturing Look at On e Form of Violence Against Women, 2 Wm. & Mary J. Women & L. 35, 45 (1995) ('2 2We now know that legislative changes have not made any difference in the arres t, prosecution and conviction of rapists.\22). Several researchers estimate th at fewer than 5% of rapists are ever convicted. See Julie A. Allison & Lawrence S. Wrightsman, Rape: The Misunderstood Crime ix (1993); Gordon & Riger, supra note 2, at 45. \par\par

n6. See Allison & Wrightsman, supra note 5, at 3 (reported rapes increased 5 9% between 1990 and 1991); Katherine K. Baker, What Rape Is and What It Ought N ot Be, \i 39 Jurimetrics J. 233 (1999)\i0 (rape remains \22massively under de terred\22); Judith V. Becker & Meg S. Kaplan, Rape Victims: Issues, Theories, and Treatment, 2 Ann. Rev. Sex Res. 267, 267 (1991) ('22In spite of all the at tention and special programs, it does not appear that rape rates have declined significantly in this society.\22). There is some evidence, however, that rape rates may be declining somewhat. See Bureau of Justice Statistics, U.S. Depart ment of Justice, Sex Offenses and Offenders: An Analysis of Data on Rape and Se xual Assault v (1997) \5Bhereinafter DOJ Statistics\5D (reporting decrease in the rape rates between 1992 and 1995). But rape rate statistics are notoriousl y difficult to interpret, since rapes appear to be significantly underreported.

See, e.g., Practical Aspects of Rape Investigation: A Multidisciplinary Approa ch xiii (Robert R. Hazelwood & Ann Wolbert Burgess eds., 2d ed. 1995) (estimat ing that less than half of all rapes are reported to police); Mary P. Koss, The Hidden Rape Victim: Personality, Attitudinal, and Situational Characteristics, 9 Psychol. Women Q. 193, 194-95 (1985) (estimating that 10 to 50 percent of rap es are reported). Comparison of rates is further complicated by recent redesign of an important survey tool. See Michael R. Rand et al., Criminal Victimizatio n, 1973-95, U.S. Dep't of Justice, Bureau of Justice Statistics: National Crime Victimization Survey 3 (1997) (advising \22extreme caution\22 in comparing s urvey results). \par

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In recent years, law's model of rape behavior - its theory of where rape com es from - has increasingly and heavily favored pure social science theories of causation, uninformed by theories that would integrate social science and life science perspectives. n7 I suspect three causes: (1) few of today's legal think ers have studied life science (so the social science theories seem more access ible); (2) the standard social science theories are assumed to align more comfo rtably with the political preferences of our time; and (3) most people incorrec tly assume that life science and social science theories are incompatible, and that they must choose between one and the other.\par

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n7. For an overview of some of the social science research on rape, see Barry Burkhart & Mary Ellen Fromuth, *Individual Psychological and Social Psychological Understandings of Sexual Coercion*, in *Sexual Coercion: A Sourcebook on Its Nature, Causes, and Prevention* (Elizabeth Grauerholz & Mary A. Koralewski eds., 1991). Even editors claiming to have compiled 'interdisciplinary' perspectives on sexual aggression routinely (often without self-reflection) omit life science perspectives in toto. See, e.g., Mary E. Odem & Jody Clay-Warner, *Introduction to Confronting Rape and Sexual Assault* xi, xi (Mary E. Odem & Jody Clay-Warner eds., 1998) (reflecting assumption that interdisciplinary rape work need only attend to social science literature). \par

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Yet excluding life science perspectives on rape behavior from the legal literature may be ill-advised. For exclusion often follows from insufficient or outdated understanding of what the life science theories of rape causation actually say, insufficient analysis of whether those theories are plausible, and often incorrect assumptions about how the descriptive 'theories from life science, even if true, would play out in the normative arenas in which people process descriptions. n8 Most often, life science perspectives on the multiple causes of sexual aggression are either ignored entirely, caricatured (as 'irresistible impulse' arguments, for example), or simply rejected as improper for polite discourse. n9\par

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n8. This is not to suggest that there is no room for informed disagreement about the usefulness of life science perspectives in the rape context. There is. Nor am I suggesting that legal scholars skeptical of using biobehavioral insights in other, more general, legal contexts have failed to address the issue with some care. Professor Deborah Rhode and Dean Herma Hill Kay, for example, have each offered constructive warnings against unreflective, improperly selective, or simplistic invocations of biology (particularly those that may rely on passing familiarity or exaggerated media reports to justify discriminatory treatment). See, e.g., Deborah L. Rhode, *Speaking of Sex: The Denial of Gender Inequality* 21-42 (1997); Herma Hill Kay, *Perspectives on Sociobiology, Feminism, and the Law*, in *Theoretical Perspectives on Sexual Difference* 74 (Deborah L. Rhode ed., 1990). \par\par

n9. See *infra* Part III. \par

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Given the frequent misuse of biology by governments and lawyers alike and the notorious attempts by some rape apologists to hide behind misarticulations of biology, ignoring biology is understandable. The potential for harm demands caution and care. Nevertheless, overcaution also costs. Wholesale exclusion of life science perspectives may very well come at the cost of inaccuracy - and the impediments to rape prevention that inaccurate or incomplete theories of causation might occasion. For it is unclear that the costs of believing something to be true, when it is not, necessarily exceed the costs of believing something not to be true, when it is. It is concern for the magnitude of these latter cost

s, in the context of rape, that prompts this writing. More specifically, the costs in human misery that might otherwise have been prevented, of mistakenly believing that the life sciences offer no constructive perspectives on rape, if in fact they do, might well exceed the costs of mistakenly believing there are biological influences on patterns of rape, if in fact there are none. \par\par

To be clear: I do not intend to champion biological theories of rape causation over social ones. For one thing, I am persuaded, for reasons made clear hereafter, that it is meaningless and misleading to argue about whether biological or sociocultural theories of rape are correct, for they are rarely mutually exclusive. For another, data in support of the biological theories are, on some important points, still inconclusive, though often no more so than data in support of sociocultural theories. There are, however, several important reasons - in view of recent rape-relevant developments in law and in science - why legal thinkers should carefully consider the possibility that the life sciences can make significant contributions to understanding rape and speeding its elimination.

First, behavioral models matter. And models that do not integrate social and life sciences into a seamless web of interconnected knowledge are rapidly obsolescing. The challenge for legal thinkers, as much with rape as with other law-relevant behaviors, is to assess the competing claims, from different disciplines, about causes and significance. For while law has no truly independent theory of rape behavior, its very ability to reduce the incidence of rape can be no more effective than the behavioral model - the theory of causation - against which its efforts must lever. Incomplete or flawed models of rape behavior, unintegrated with or inconsistent with what is known about the evolution of the human brain's information-processing patterns, portend in this legal context what incomplete or flawed behavioral models portend in every other: that all efforts based upon them are less likely to be successful than would be efforts based on less incomplete or flawed behavioral models. Consequently, the effectiveness of policies and programs for punishing and deterring rape will necessarily reflect the choices legal thinkers make, as consumers of behavioral models offered up by others. Integrative efforts can bring disparate pieces of knowledge about rape together, to synthesize from the best aspects of different life science and social science disciplines an organic whole that is greater than the sum of its parts. This whole would be boundariless in its applicability, internally consistent, and potentially practical in its applications for legal thinking.

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n10. See John Tooby & Leda Cosmides, *The Psychological Foundations of Culture*
e, in *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* 1
9, 23 (Jerome H. Barkow et al. eds., 1992). \par\par

n11. See Owen D. Jones, *Evolutionary Analysis in Law: An Introduction and Application to Child Abuse*, 175 N.C. L. Rev. 1117 (1997) (hereinafter Jones, *Evolutionary Analysis in Law*) (proposing method by which law's models can be supplemented with life science theories); Owen D. Jones, *Law and Biology: Toward an Integrated Model of Human Behavior*, 8 J. Contemp. Legal Issues 167, 167-73 (1997) (exploring the relationship between behavioral models and law).

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Second, human behavior is now known to reflect evolved behavioral predispositions that influence the probabilities of various kinds of behavior. Rape behavior may be one of them. It is increasingly evident to science that members of the human species, like members of all other animal and plant species, exhibit a wide variety of behavioral predispositions. In our case, these are highly contingent, and powerfully affected by environmental conditions and abstract reasoning. These predispositions, as explored below, tend to reflect the accumulated effects of natural selection, operating not only on the external form of our distant ancestors, but also on the brain's neural architecture and information processing pathways. Through their effects on our perceptions, emotions, and preferences, these predispositions influence the probability that we will respond to certain kinds of stimuli with certain kinds of behavior. In sum, the more directly and substantially a behavior affected the reproductive success of our ancestors, human and nonhuman, the greater the likely effect of evolutionary processes on the current patterns of its incidence. Because rape was historically more likely to result in reproduction than any number of alternative behaviors, such as voluntary abstinence, it is plausible that behavioral biology has something to contribute to an understanding of rape's complexities.

Third, rape researchers can now point to several notable, and in some cases startling, patterns of human rape data that seem patently inconsistent with social science theories unsupplemented by recent life science advances. These patterns are instead consistent with testable predictions of the biological theories, as well as with precise patterns of forced copulation in a number of other species - including some of our closest primate relatives. At the very least, the inability of popular theories to explain these patterns parsimoniously is puzzling. At most, that inability may highlight potentially serious weaknesses in conventional theories about the causes of rape.

Fourth, the scholarly literature exploring the biology of rape in both nonhuman and human animals has grown dramatically in the last twenty years. And new works, both in biology and in law, are recently published or forthcoming. Given the remarkably common and commonly perfunctory dismissals of biological theories, the law is now notably unprepared to assess this literature, lacking any thorough examination of what the biological theories of sexual aggression really are.

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- ⁿ¹². See *infra* Appendix A (collecting selected sources).
- ⁿ¹³. Following a recent Colloquium on Biology and Sexual Aggression: Investigating Theories, Data, and Implications for Law (sponsored by the National Science Foundation, The Center for the Study of Law, Science, and Technology, and the Society for Evolutionary Analysis in Law), *Jurimetrics: The Journal of Law, Science, and Technology* published Colloquium papers in two special issues, Winter and Spring 1999. Those papers include: Katharine K. Baker, What Rape Is and What It Ought Not to Be; Charles Crawford & Marc A. Johnston, An Evolutionary Model of Courtship and Mating as Social Exchange; Deborah W. Denno, Evolutionary Biology and Rape; Steven Goldberg, Statistics, Law, and Justice; Cheryl Hanna, Sometimes Sex Matters; Timothy H. Goldsmith & Owen D. Jones, Evolutionary Biology and Behavior: A Brief Overview and Some Important Concepts; Martin L. Lalumière & Vernon L. Quinsey, A Darwinian Interpretation of Individual Differences in Male Propensity for Sexual Aggression; Neil M. Malamuth & Eldad Z. Malamuth, Integrating Multiple Levels of Scientific Analysis and the Confluence Model of Sexual Coercers; Linda Mealey, The Multiplicity of Rape: From Life History St

strategies to Prevention Strategies; Ronald D. Nadler, Sexual Aggression in the Great Apes: Implications for Human Law; Craig T. Palmer et al., Is It Sex Yet? Theoretical and Practical Implications of the Debate Over Rapists' Motives; Cassia C. Spohn, The Rape Reform Movement: The Traditional Common Law and Rape Law Reforms; Randy Thornhill, The Biology of Human Rape. \par\par

n14. See Randy Thornhill & Craig Palmer, Why Men Rape, Why Women Suffer: Rape, Evolution, and the Social Sciences (forthcoming 1999) (on file with author).

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n15. For several useful attempts to begin incorporating these theories into law, see John H. Beckstrom, Darwinism Applied: Evolutionary Paths to Social Goals 53-65 (1993); Richard Posner, Sex and Reason 106-08, 383-404 (1992); and Brian Kennan, Evolutionary Biology and Strict Liability for Rape, 22 L. & Psychol. Rev. 131 (1998). \par

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\5B*835\5D Fifth, the motive for rape has recently attained greater legal significance. n16 For example, the federal Violence Against Women Act of 1994

n17 (VAWA) created a new civil rights cause of action for \22crimes of violence motivated by gender.\22 n18 To be \22motivated by gender,\22 violent crimes must be: (a) \22committed because of gender or on the basis of gender\22; and (b) \22due, at least in part, to an animus based on the victim's gender.\'

\22 n19 Legislative history makes clear that Congress did not, in the end, intend courts to assume that all rapes were \22motivated by gender,\22 and thus at least partly animated by animus. n20 It left to the courts (informed by legal reasoning in other civil rights contexts) n21 the task of applying these tests on a case-by-case basis. Understanding why people rape is surely important in this endeavor.\par

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n16. See, e.g., Katharine K. Baker, Once A Rapist? Motivational Evidence and Relevancy in Rape Law, 110 Harv. L. Rev. 563 (1997).\i0 \par\par

n17. Pub. L. No. 103-322, 40111(a)-40611, 108 Stat. 1796, 1903-53 (codified as amended in scattered sections of 8, 18, 28, and 42 U.S.C.). \par\par

n18. 42 U.S.C. 13981\i0 (a) (1994). VAWA defines \22crime of violence\22 as \22an act or series of acts that would constitute a felony against the person <elip> and that would come within the meaning of State or Federal offenses described in section 16 of title 18 <Elip>\22 Id. 13981(d)(2)(A). \par\par

n19. Id. 13981(d)(1). \par\par

n20. See, e.g., S. Rep. No. 103-138, at 51 (1993) (\22Title III does not create a general Federal law for all <elip> rapes against women.\22); see also \i Anisimov v. Lake, 982 F. Supp. 531, 541 (N.D. Ill. 1997)\i0 (so finding). \par\par

n21. See, e.g., S. Rep. No. 103-138, at 52 (1993) (\22Proof of \22gender motivation' <elip> should proceed in the same ways proof of race or sex discrimination proceeds under other civil rights laws. Judges and juries will determine \22motivation' from the \22totality of the circumstances' surrounding the event.\22). \par

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As scholars predicted, n22 litigants are hotly disputing the meaning of \22

motivated by gender,²² and the scope of the civil rights remedy. ²³ To date, at least one federal court has opined that cases in which rape would not have been motivated by gender,²² with sufficient and prerequisite animus,²² would appear to this Court to be few and far between.²⁴ And another court, in the context of an unwanted fondling, has employed a standard for animus so low that all rapes would seem to qualify. ²⁵ Moreover, a number of legal commentators have started arguing for a rebuttable presumption of animus in rape cases, ²⁶ asserting that gender animus is an underlying factor in almost all rapes.²⁷ Making motive an element of the civil rights action therefore necessarily raises empirical questions about causation on which science has much to say.

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²². See, e.g., Reva B. Siegel, 'The Rule of Love': Wife Beating as Prerogative and Privacy, 105 Yale L.J. 2117, 2200 (1996) ('There will be a struggle over the scope of the civil rights remedy'); see also David Frazee, An Imperfect Remedy for Imperfect Violence: The Construction of Civil Rights in the Violence Against Women Act, 1 Mich. J. Gender & L. 163, 182-83, 256 (1993) (observing that the meaning of 'animus' is unclear, and that courts may severely limit VAWA's scope).

²³. See, e.g., *Brzonkala v. Virginia Polytechnic Inst. and State Univ.*, No. 96-2316, 96-1814, 1999 WL 111891 (4th Cir. Mar. 5, 1999) (holding that Congress lacks constitutional authority to enact the VAWA section relevant here); *Doe v. Hartz*, 134 F.3d 1339 (8th Cir. 1998), rev'd in part, vacating in part *Doe v. Hartz*, 970 F. Supp. 1375 (N.D. Iowa 1997); *Braden v. Piggly Wiggly*, 4 F. Supp. 2d 1357 (M.D. Ala. 1998); *Anisimov*, 982 F. Supp. 531; *Mattison v. Click Corp.*, No. Civ.A.97-CV-2736, 1998 WL 32597 (E.D. Pa. Jan. 27, 1998).

²⁴. *Anisimov*, 982 F. Supp. at 541.

²⁵. See *Doe*, 970 F. Supp. at 1375, rev'd on other grounds, *Doe*, 134 F.3d at 1339. The lower court concluded that 'because unwanted or unwelcome sexual advances may be demeaning and belittling, and may reasonably be inferred to be intended to have that purpose or to relegate another to an inferior status, even if the advances were also intended to satisfy the actor's sexual desires, the allegations of the 'animus' element here are sufficient.'²² *Doe*, 970 F. Supp. at 1408.

²⁶. See, e.g., Jennifer Gaffney, Note, Amending the Violence Against Women Act: Creating a Rebuttable Presumption of Gender Animus in Rape Cases, 6 J.L. & Pol'y 247 (1997); see also Sally Goldfarb, The Civil Rights Remedy of the Violence Against Women Act: Legislative History, Policy Implications, and Litigation Strategy, 4 J.L. & Pol'y 391, 398-99 (1996) (claiming that 'the burden on the plaintiff to show gender-based animus is not as onerous as some have argued, and citing authors who would prefer that the legislation presume that rape is always gender-motivated'). One commentator has argued that the statute should be amended to strike the animus requirement altogether, and to make rape per se actionable under VAWA. See Frazee, *supra* note 22, at 242-43, 245-47.

²⁷. Gaffney, *supra* note 26, at 264.

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My goals in exploring the life science perspectives on rape are several. Because it is evident that one of the things clouding scholarly discourse about th

e extent of biological influences on rape is widespread misperception of the biological theories themselves, my first purpose is to clarify for a legal audience what the main theories positing biological influences on the patterns of rape do and do not say. That is the task of Part I. n28 Part II briefly surveys some of the predictions that these biobehavioral theories generate, as well as some of the quite provocative evidence that tests those predictions. My purpose is not to compile all the evidence, for and against, as if I were attempting here to prove or falsify the theories. Rather, I provide a short overview of predictions and evidence, exploring general plausibility. This is to help legal thinkers assess whether they should bother to study the theories separately - and then, if inclined, critique them - in greater detail.\par

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n28. This Article largely follows the method for conducting evolutionary analysis in law articulated in Jones, Evolutionary Analysis in Law, supra note 11.

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In Part III, I offer some recommendations about how legal scholars can process the emerging information about biobehavioral theories of sexual aggression. Specifically, I explore surprisingly common, but avoidable, analytic errors. In Part IV, I offer several observations on the vitality of rape theories without life science perspectives, consider how the life science theories, if true, might affect several rape myths, and discuss the possibility of integrating biobehavioral theories with social science theories. \par\par

In Part V, I speculate on concrete legal applications where biobehavioral theories, if true, might make a difference. This latter foray is necessarily conjectural, since one can never legitimately reason from the explanations of biology to any normative conclusion, without importing other values . n29 No recommendations in law can follow automatically from theories of biological influence on rape patterns, even if we were persuaded that any one of those theories were likely accurate. On the other hand, given a number of social concerns our legal system already manifests, and the underlying values those concerns reflect, the biobehavioral theories of rape may soon have legal effects in the contexts of policy choices, legislative strategies, rape trials and sentences, and the legal history of rape law. The better we can understand rape, the better we might be able, through law, to prevent and deter it.\par

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n29. To do so is to commit the well-known Naturalistic Fallacy - reasoning from an 'is' to an 'ought to be.' See infra Section III.M. \par

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Of course, the potential for volatile controversy when discussing either rape or human behavioral biology, let alone the two combined, recommends several important caveats. For surely some may suspect that I am about to defend rapists as mere instruments of biological imperatives, or to excuse (and thereby somehow to demean the significance of) acts of sexual aggression, or to argue for mitigation of sentences because 'genes made him do it.' \par\par
In truth, I intend none of these things. There is no known or anticipated th

eory of rape behavior, biological or otherwise, that excuses or justifies rape, exculpates its perpetrators, mitigates appropriate punishments, or requires us to tolerate its existence. So that it may be clear, my purpose is to explore ways to understand rape that may lead to more effective ways to prevent it. If the life sciences can help to achieve that goal, then we should explore them further. If they cannot, we may disregard them. But I am persuaded that we cannot conclude whether exploration or disregard is more appropriate without further examination of the life science perspectives themselves. \par\par

I Patterns of Rape: Theories of Biological Influence\par\par

This Part provides necessary context for careful consideration of modern life science theories about sexual aggression and forced copulation. Section I.A offers a brief overview of academic research on rape, to provide both historical perspective and a sense of where rape scholarship is today. Section I.B describes the conceptual superstructure of behavioral biology. It provides the essential foundation for understanding the biobehavioral theories of rape, which are the subject of Section I.C. In my view, much of the confusion over biobehavioral theories of sexual aggression traces to an incomplete grasp of these biology basics and their constituent terms of art. \par\par

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A. Theories of Rape: A Short History\par\par

Because numerous scholars have more than adequately chronicled the history of most rape theories and rape law, I can limit my comments to those that provide context. n30 In the beginning, few people really cared. Rape was considered rare and, in the eyes of many, either excusable or insignificant. n31 Most of the few early rape theorists, in the 1950s and 1960s, were psychiatrists. n32 In their view, rapists were sick individuals (different from men in general) whose behavior reflected mental illness and 'irresistible impulses' as a function of personality, adjustment, or biochemical abnormalities. n33 The law dutifully adopted this perspective, and \5B*839\5D by 1965 thirty states had enacted sexual psychopath laws that generally defined a rapist as 'a person unable to control his sexual impulse or having to commit sex crimes.' n34\par

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n30. For sources providing useful overviews, see Allison & Wrightsman, *supra* note 5; Larry Baron & Murray A. Straus, *Four Theories of Rape in American Society* (1989); Burgess-Jackson, *supra* note 4; Lee Ellis, *Theories of Rape: Inquiries into the Causes of Sexual Aggression* (1989); Estrich, *supra* note 3; Gregory M. Matoesian, *Reproducing Rape: Domination Through Talk in the Courtroom* (1993); Rape (Sylvana Tomaselli & Roy Porter eds., 1986); Rape and Sexual Assault: A Research Handbook (Ann Wolbert Burgess ed., 1985); Rape and Society: Readings on the Problem of Sexual Assault (Patricia Searles & Ronald J. Berger eds., 1995); Rape and the Criminal Justice System (Jennifer Temkin ed., 1995); Schulhofer, *supra* note 3; Sex, Power, Conflict: Evolutionary and Feminist Perspectives (David M. Buss & Neil M. Malamuth eds., 1996); Scully, *supra* note 1; Sexual Coercion, *supra* note 7; Spohn & Horney, *supra* note 4; Colleen A. Ward, *Attitudes Toward Rape: Feminist and Social Psychological Perspectives* (1995); Ronald J. Berger et al., *The Dimensions of Rape Reform Legislation*, 22 L. & Soc'y Rev. 329 (1988); Bienen, *supra* note 5; Joan Nordquist, *Rape: A Bibliography*, 19 Contemp. Soc. Issues: A Bibliographic Series 5 (1990). \par\par

n31. See generally Estrich, *supra* note 3 (providing an overview of developme

nts in rape law); Camille E. LeGrand, Rape and Rape Laws: Sexism in Society and Law, 61 Calif. L. Rev. 919 (1973) (same). There was little scholarship on rape before 1965. See Elizabeth Jane Kemmer, Rape and Rape-Related Issues: An Annotated Bibliography xii (1977). Kemmer notes that

from approximately 1965 to 1968, rape literature focused on the offender and the unjust system that convicted the falsely accused male of so heinous a crime. The sympathy of the public was with the offender, thus making the victim the guilty party in a rape situation. Rape was still a fairly silent, secret crime - a crime whose victims were the most silent of all.

Id.

n32. For a short history of early psychiatric approaches to rape, see Richard T. Rada, Sexual Psychopathology: Historical Survey and Basic Concepts, in Clinical Aspects of the Rapist 1, 3-10 (Richard T. Rada ed., 1978). See also Ron Langevin, Sexual Strands: Understanding and Treating Sexual Anomalies in Men 413, 414-22 (1983) (describing psychiatric theories and treatments for rapists).

n33. See generally Diana Scully & Joseph Marolla, Rape and Vocabularies of Motive: Alternative Perspectives, in Rape and Sexual Assault, supra note 30 (discussing vocabulary of motives in psychiatric, psychopathological models of rape). Rapists were at the time considered to be (like homosexuals, voyeurs, exhibitionists, and pedophiles) sexual deviants. See Samuel David Smithyman, The Undetected Rapist 9 (1978) (unpublished Ph.D. dissertation, Claremont Graduate School); see also Matoesian, supra note 30, at 6-10. For example, Groth, a clinical psychologist and proponent of the psychiatric perspective on rape, claimed that rape is always a symptom of some psychological dysfunction, either temporary and transient or chronic and repetitive. The rapist is, in fact, a person who has serious psychological difficulties which handicap him in his relationships to other people and which he discharges, when under stress, through sexual acting out. A. Nicholas Groth, Men Who Rape: The Psychology of the Offender 5-6 (1979). Consistent with its medical model of rape, early psychiatric treatments were oriented toward diagnosis, treatment, and rehabilitation, and included such methods as castration, psychosurgery, electric shock, and hormonal and mind-control drug therapy, and psychotherapy.... Scully, supra note 1, at 36.

n34. Scully, supra note 1, at 35 (citing Karl M. Bowman & Bernice Engle, Sexual Psychopath Laws, in Sexual Behavior and the Law 757 (Ralph Slovenko ed., 1965)).

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As an outgrowth of commentary in the 1970s that brought women's experiences to the fore, rape received increased scholarly attention outside psychiatric circles. Susan Brownmiller's *Against Our Will* is widely credited as a principal catalyst in making rape an important topic - socially, legally, and academically. It also helped to initiate a branching and diverse collection of perspectives on rape, loosely termed the feminist perspectives.

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n35. Susan Brownmiller, *Against Our Will: Men, Women and Rape* (1975). Other works of major import included Susan Griffin, *Rape: The All-American Crime*, in

Ramparts 26 (1971) and Diana E.H. Russell, *The Politics of Rape: The Victim's Perspective* (1975). See also Craig Palmer, *Twelve Reasons Why Rape Is Not Sexually Motivated: A Skeptical Examination*, 25 J. Sex Res. 512, 513 (1988) (surveying literature). For a view of how feminism drew attention to rape, see Vicki McNickle Rose, *Rape as a Social Problem: A Byproduct of the Feminist Movement*, 25 Soc. Probs. 75 (1977).

n36. On the development of feminist perspectives generally, see Josephine Donovan, *Feminist Theory* (1985); Judith Grant, *Fundamental Feminism: Contesting the Core Concepts of Feminist Theory* (1993); and Rosemarie Tong, *Feminist Thought: A Comprehensive Introduction* (1989). Overviews of feminist perspectives on rape include Matoesian, *supra* note 30, at 5-22; Nancy A. Matthews, *Confronting Rape: The Feminist Anti-Rape Movement and the State* (1994); Rhode, *supra* note 3; Scully, *supra* note 1, at 33-61; Ward, *supra* note 30, at 18-37; Patricia L.N. Donat & John D'Emilio, *A Feminist Redefinition of Rape and Sexual Assault: Historical Foundations and Change*, 48 J. Soc. Issues 9 (1992); Mary Ann Lagen, *The Anti-Rape Movement: Past and Present*, in *Rape and Sexual Assault*, *supra* note 30; and Rebecca M. Ryan, *The Sex Right: A Legal History of the Marital Rape Exemption*, 20 L. & Soc. Inquiry 941, 968-92 (1995).

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Any attempt to attribute common elements to feminist perspectives is difficult, of course, because of differences both large and subtle among them. n37 The majority of these perspectives, however, grow from the central idea that rape is the consequence of: (a) social traditions that reflect male power and dominance, on one hand, and female powerlessness and exploitation, on the other; (b) socially stratified and unequal gender roles; and (c) cultural attitudes and assumptions about men, women, and rape. n38 In this view, patriarchal culture socializes males to be potential rapists. n39 And because rape reflects systemic political and power imbalances between men and women, rape is largely reconceptualized from a 'sex' crime (motivated by sexual desire) to a 'violent' crime (motivated by misogyny). n40

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n37. For example, some feminists argue that rape is not sex. See Lagen, *supra* note 36, at 5 (describing how the 'Rape Is Violence, Not Sex' motto characterized a number of feminist efforts). Others are of the view that rape can be sex, at least to the perpetrator, and therefore is often 'just' sex to the law. See, e.g., Catharine A. MacKinnon, *Feminism Unmodified: Discourses on Life and Law* 160 (1987) ('Women and men know men find rape sexual'); Catharine A. MacKinnon, *Toward a Feminist Theory of the State* 180 (1989); see also Catharine A. MacKinnon, *Feminism, Marxism, Method, and the State: Toward Feminist Jurisprudence*, 8 Signs 635 (1983) (discussing different feminist approaches to the subject of rape). 'Some see rape as an act of violence, not sexuality, the threat of which intimidates all women. Others see rape, including its violence, as an expression of male sexuality, the social imperatives of which define all women.' Id. at 646. For concise descriptions of the breadth of feminist perspectives, see Allison M. Jaggar, *Feminist Politics and Human Nature* 3-13 (1983), and Ward, *supra* note 30, at 18-37. See also *Sourcebook on Feminist Jurisprudence* (Hilaire Barnett ed., 1997); Torrey, *supra* note 5.

n38. See Ward, *supra* note 30, at 10 (citing Rose, *supra* note 35; and Pamela Lakes Wood, *The Victim in a Forcible Rape Case: A Feminist View*, 111 Am. Crim

. L. Rev. 335 (1973));¹⁰ see also Linda Brookover Bourque, Defining Rape 14-58 (1989). \par\par

n39. See, e.g., Ward, *supra* note 30, at 6; Odem & Clay-Warner, Introduction to Confronting Rape and Sexual Assault, *supra* note 7, at xi; Patricia Searles & Ronald J. Berger, Why Men Rape, in Rape & Society, *supra* note 30, at 1, 51. For a useful summary, see Matoesian, *supra* note 30, at 10-18. \par\par

n40. See, e.g., William B. Sanders, Rape and Woman's Identity 22 (1980). \par
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Sociologists, for their part, generally concurred with feminists. As feminists were attempting to shift attention from individuals to sexist practices, sociologists were attempting to refocus rape research from rapist motivations to the contexts in which rape occurs. n41 From the sociological perspectives, rape is typically a product not of individual pathology, but of collective cultural determination. n42 That is, social conditions, such as cultural norms, rules, and prevailing attitudes about sex, mold and structure the behavior of the rapist within the context of the broader social system, fostering rape-prone environments and, in effect, teaching men to rape. n43 As the feminist and sociologist literature has grown, the psychopathology model of rapists as sick people needing psychiatric treatment has suffered a gradual decline. n44\par

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n41. The classic early sociological text is Menachem Amir, Patterns in Forcible Rape (1971). See also Elaine Hilberman, The Rape Victim 28 (1976) (emphasizing the sociocultural context of rape); Sanders, *supra* note 40, at 28 (1980) ('22As a focal point and perspective, sociology has taken over the place of psychiatry in the study of rape.'22); Mary Beard Deming & Ali Eppy, The Sociology of Rape, 65 Soc. & Soc. Res. 357 (1981) (same); Lorne Gibson et al., A Situational Theory of Rape, 22 Can. J. Criminology 51 (1980) (sociologists distinguishing sociological perspectives on rape from prior ones); Kurt Weis & Sandra S. Borges, Victimology and Rape: The Case of the Legitimate Victim, 8 Issues in Criminology 71 (1973). \par\par

n42. See Amir, *supra* note 41. \par\par

n43. See, e.g., Sanders, *supra* note 40. There are, of course, a number of different approaches within the sociological tradition, including cultural approaches (focusing on a society's belief and value systems); institutional approaches (focusing on medical and justice institutions' reactions to rape); and situational approaches (collating situational elements in rape). See *id.* \par\par

n44. While psychopathology remains today a viable explanation for the behavior of some rapists in special cases, see *infra* note 177, it has been unpopular as an explanation for rape behavior generally since roughly the late 1970s. See Matoesian, *supra* note 30, at 6. For a recent review of psychiatric perspectives, see Elizabeth Janssen, Understanding the Rapist's Mind, Persp. Psychiatric Care, Oct.-Dec. 1995, at 9. \par

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This much is widely known. Less known is that efforts to understand rape in humans as a phenomenon unique to human culture have long been paralleled by the efforts of biologists and animal behaviorists to understand \5B*841\5D w

idespread male-female sexual aggression among many other species. The literature on animal sexual aggression has grown steadily over the last thirty years as a subset of the massive literature on aggression generally. Only rarely have researchers on either side of the social science and life science divide attempted to engage each other directly. And many attempts have been famously unproductive. n45\par

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n45. For example, in 1983 psychology Professor Delbert D. Thiessen was invited to give a 'Fellow's Address' at the meeting of the Division for Comparative and Physiological Psychology at the annual convention of the American Psychological Association. He entitled his talk 'Rape as a Reproductive Strategy: Our Evolutionary Legacy.' In advance of the talk, several critics charged that the title, as publicized, was offensive - in that it suggested that rape was an acceptable method for procreating. Hostile reaction inspired a small book from the critics: *Violence Against Women: A Critique of the Sociobiology of Rape* (Suzanne R. Sunday & Ethel Tobach eds., 1985) 'Hereinafter Sunday & Tobach', in which some history of this episode is recounted. In my view, this unfortunate incident is traceable, in large part, to the cross-disciplinary ambiguity of the term of art 'reproductive strategy' - which has a normative implication in lay minds, and no such implication to evolutionists. See, e.g., Julie Blackman, *The Language of Sexual Violence: More Than a Matter of Semantics*, in Sunday & Tobach, *supra*, at 115, 126 ('Strategies and legacies are connotatively positive <Elip>'). \par\par

There are signs, however, that dialogue bridging the life science and social science perspectives on rape is successfully re-emerging. For example, the Arizona State University Center for the Study of Law, Science, and Technology, together with the National Science Foundation and the Society for Evolutionary Analysis in Law, sponsored an interdisciplinary Colloquium on Biology and Sexual Aggression: Investigating Theories, Data, and Implications for Law. The Colloquium brought together academics in law, biology, primatology, sociology, anthropology, psychology, and several other disciplines. For published papers, see *supra* a note 13. \par

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Much of this failure to integrate social and life sciences perspectives on rape traces back to culture and vocabulary, as each of the relevant disciplines sports its own goals, traditions, and essential terms of art. Some of the failure traces to disciplinary xenophobia, with each tribe suspicious of the motives and meanings of the other. But more important than the early causes and actual history of this interdisciplinary miscommunication, for present purposes, is the simple fact that the legal academy faces seemingly competing claims about the causes of a behavior it must help to stop. Evaluating these claims requires some scholarly facility in their underlying logic. \par\par

The claims and logic of social science theories of rape are today sufficiently distributed and well-known within the legal community that I will assume some general familiarity. n46 I now turn to examine current thinking in biology about possible influences of evolutionary processes and history on human patterns of behavior generally, and on sexually aggressive behavior in particular.\par

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n46. See, for example, sources cited supra notes 3 & 30. \par
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B. Core Principles of Behavioral Biology\par
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Theories of possible biobehavioral influences on rape patterns in humans are not free-standing. They rest on, and derive logical support from, several core principles of modern biology that are uncontroversial within relevant scientific communities, and without which these theories might appear simply incomprehensible. n47 We look first to the relationship between brain biology and behavior (which subjects some behaviors to evolutionary processes), then to the principles of natural and sexual selection (processes that strongly affect the distribution, within a population, of behavioral predispositions), and thereafter to the evolution of species-typical or evolved psychological tendencies, which biologists tell us are widely shared within each living animal species, including humans.\par
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n47. A more thorough treatment of this subject is beyond the scope of this Article, of course, and anything more than an introductory familiarity with behavioral biology principles requires separate study. A more comprehensive introduction to law-relevant principles of behavioral biology, written specifically for legal thinkers without biology backgrounds, appears in Part I: A Primer in Law-Relevant Evolutionary Biology, of Jones, Evolutionary Analysis in Law, supra note 11, at 1127-57, on which some portions of the ensuing material draw. See also Goldsmith & Jones, supra note 13. More thorough treatments of modern behavioral biology for the general audience include: Timothy H. Goldsmith, *The Biological Roots of Human Nature: Forging Links Between Evolution and Behavior* (1991); Matt Ridley, *The Red Queen: Sex and the Evolution of Human Nature* (1994); Robert Wright, *The Moral Animal: Evolutionary Psychology and Everyday Life* 55-107 (1994). Accessible textbooks, for gaining more technical familiarity, include: John Alcock, *Animal Behavior: An Evolutionary Approach* (6th ed. 1998); Martin Daly & Margo Wilson, *Sex, Evolution, and Behavior* (2d ed. 1983); Scott Freeman & Jon C. Herron, *Evolutionary Analysis* (1998); Douglas J. Futuyma, *Evolutionary Biology* (2d ed. 1986); Timothy H. Goldsmith & William F. Zimmerman, *Biology, Evolution, and Human Nature* (forthcoming 1999); J.R. Krebs & N.B. Davies, *An Introduction to Behavioural Ecology* (3d ed. 1993); Mark Ridley, *Evolution* (1993); Robert Trivers, *Social Evolution* (1985). \par
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1. From Brains to Behavior\par
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At the most general level, the architecture and function of the brain is as much a product of evolution as the architecture and function of the hand, heart, or stomach. The brain is an organ adapted to performing certain kinds of tasks, and certain kinds of tasks better than others. Like all aspects of animal morphology, it is best at performing those tasks that contributed to solving problems faced by evolutionary ancestors in various ancestral environments (commonly termed, for each adaptation, the Environment of Evolutionary Adaptation, or EEA). n48 It solved these problems in part by causing different states of

the nervous system (which, like hunger, increase the probability of certain kinds of behaviors) to follow from perception of different environmental stimuli (which, like locating a high-calorie food, render some of the many possible responsive behaviors more appropriate than others). To the extent that ensuing populations of a species encountered similar environmental challenges, over generations, increasing proportions of the population in each generation tended to share the best available problem-solving, behavior-biasing brain characteristics inherited from successful ancestors.

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n48. The mind is a system of organs of computation, designed by natural selection to solve the kinds of problems our ancestors faced in their foraging way of life, in particular understanding and outmaneuvering objects, animals, plants, and other people. Steven Pinker, *How the Mind Works* 21 (1997).

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It is difficult to see how evolutionary processes shaped the human brain, increment by increment, without first appreciating evolutionary time. The human species, like every other living species, is the product of roughly 3.9 billion years of evolution. Our ancestors had evolved into mammals only 200 million years ago, and into what we think of as primates only 70 million years ago. Roughly 6 million years ago (following 64 million years of shared primate history) our earliest hominid ancestors parted biological ways with the direct ancestors of today's chimpanzees and bonobos, our closest primate relatives. And yet it was still not until merely 35,000 years ago that our own subspecies of *Homo sapiens* (which we imagine when we think of ourselves) had apparently displaced our competing subspecies, *Homo sapiens neanderthalensis*, causing the latter's extinction.

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n49. See generally Richard Dawkins, *Climbing Mount Improbable* (1996) (addressing often counter-intuitive processes by which complexity can emerge by increments).

n50. See Richard Cowen, *History of Life* 33, 284, 390 (2d ed. 1995).

n51. See *id.* at 419-21; see also Ian Tattersall, *The Fossil Trail: How We Know What We Think We Know About Human Evolution* 229-46 (1995); Ian Tattersall, *The Last Neanderthal: The Rise, Success, and Mysterious Extinction of Our Closest Relatives* 174-99 (1995).

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During all this time the precursors to our current human brains continued to evolve. To the extent variation in brain structures affected behavior, behavioral outcomes affected changes in brain form and function across generations. More specifically, to the extent that patterns of information processing led to general psychologies that tended, in turn, to increase the probability of useful behaviors, and to decrease the probability of reproductively unhelpful or harmful behaviors, heritable patterns in the way human brains process information evolved. During all of evolutionary time leading to the present, the behavioral

predispositions of our ancestors were sifted according to specific and relentless principles, the details of which provide a window to the modern human mind.

To see this, remember that every organism alive today is descended from first life on this planet in an unbroken chain of reproductively successful parents. That is, none of our individual ancestors, unlike many of their contemporaries, died without offspring that themselves had offspring. The heritable physical and behavioral characteristics of individuals that are reproductively successful are simply far more likely to appear in any later generation than are heritable characteristics of the myriad individuals that were not reproductively successful. Consequently, heritable traits that persist within species for any substantial length of evolutionary time, including traits within brain function that affect the probability of different behaviors, generally can be understood in relation to their average effects on the reproductive success of organisms that bear them.

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n52. The term 'reproductive success' has very specific meanings. It is often used in the narrow sense of 'direct fitness' (which includes genes replicated only in direct descendants) and is often distinguished from 'indirect fitness' (which includes the genes replicated indirectly by increasing the reproduction of non-descendent kin). See Alcock, *supra* note 47, at 566-69, G2, G5; see also *infra* note 53 (discussing 'inclusive fitness'). To avoid confusion, reproductive success is used here in the broader sense also common in ethological literature. See, e.g., Paul Turke & L.L. Betzig, *Those Who Can Do: Wealth, Status, and Reproductive Success on Ifaluk*, 6 *Ethology & Sociobiology* 79, 79 (1985) ('Modern Darwinian theory predicts that human behavior will be adaptive, that is, designed to promote maximum reproductive success (RS) through available descendent and nondescendent relatives.') (emphasis added).

n53. We know for certain that every creature, at every moment, is the product of ancestors traceable back in time, generation by generation. Yet not every creature will itself become an ancestor. Only the heritable physical and behavioral characteristics of ancestors stand a chance of being replicated into successive generations and of traveling down through time to that slice of time we happen to be studying. See generally Richard Dawkins, *River Out of Eden: A Darwinian View of Life* 1-29 (1995) (highlighting evolutionary significance of ancestors with metaphor comparing genetically influenced traits to a digital river, flowing through time).

Reproductive success is not measured in offspring alone, however, for offspring are not the only genetic relatives an individual has. Since other relatives also share genes with an individual, their reproductive success also contributes to the individual's reproductive success, and one needs to take account of the extent to which an individual has increased the reproductive success of its relatives (discounted by their degree of relatedness). This cumulated, additive calculation of reproductive success is known as 'inclusive fitness.' See Alcock, *supra* note 47, at 561-69. Consequently, an organism can be reproductively successful by increasing its inclusive fitness, even if it does not itself have offspring.

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2. Natural Selection\par

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Because unchecked reproduction tends to yield geometric increases in a species' population size at the same time that exploitable resources of the world are ultimately finite, evolutionary processes are inherently competitive. n54 The de facto competition for genetic representation in each successive generation is powerfully influenced by the process known as natural selection. n55 Natural selection effectively punishes characteristics that do not contribute to their own replication at least as well as do other contemporaneously existing characteristics, by diminishing their proportional representation in future populations

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n54. As economist Jack Hirshleifer has observed, Darwin's ideas are consistent with universal economic laws: The patterns of social organization are the product of scarcity of resources, of the limited availabilities of materials and energy in the face of the unlimited expansive tendency of life. J. Hirshleifer, *Natural Economy Versus Political Economy*, 1 J. Soc. & Biological Structures 319, 337 (1978).

n55. Technically, natural selection is one of four factors influencing gene frequencies. See Goldsmith, *supra* note 47, at 29-31. The other three are: (1) mutation, involving replication errors in genetic codes; (2) gene flow, referring to migration of genes between populations due to the movement of organisms carrying them; and (3) random drift, which describes effects of chance events, such as accident or disease, on reproductive success. Of these four, natural selection has by far the most powerful influence. See *id.*

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The essential key to understanding the effects of natural selection's incessant sifting of physical and behavioral characteristics, over long periods of time, lies in recognizing the inevitable result of combining three fundamental features of life on our planet:

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(1) Heredity - Genetically influenced physical and behavioral traits sometimes pass from parent to offspring (in which case they are called heritable).

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n56. See Alcock, *supra* note 47, at 14-16.

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(2) Variation - Individuals of a species may differ in their physical and behavioral traits.

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n57. See *id.* Variations are the things that prevent us from calling parent and offspring identical. Variations relevant to the discussion at this point are those that are genetically heritable. These are ultimately caused by mutation, and later augmented (in many species) by recombination. See Goldsmith,

supra note 47, at 29-30. \par

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(3) Differential Reproduction - Some inherited traits will enable some individuals possessing them to leave more offspring and reproductive relatives than other individuals. n58\par

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Organisms that are not genetically identical often will differ in their physical and behavioral traits (resulting in within-species 'variation'). Each genetically influenced (and thus 'heritable') trait will prove 'adaptive' (that is, advantageous), 'maladaptive' (that is, disadvantageous), or 'neutral' with respect to its effect on the reproductive success of the organism bearing it. n59 When a heritable trait is adaptive, and increases an individual's reproductive success relative to the reproductive success of the individual's contemporaries (resulting in 'differential reproduction'), then that trait will correspondingly increase in prevalence in successive generations of a population, reflecting the awesome power of exponential growth. n60 For example, even a heritable trait providing its possessor with a mere 1% reproductive advantage over its contemporaries will swell (all else being equal) from 1% representation in a population to 99% in a mere 265 generations. n61 Conversely, when a heritable trait is maladaptive, and decreases the reproductive success of the organism bearing it relative to the reproductive success of the organism's contemporaries, then that trait, on average, will decrease in prevalence in successive generations. This phenomenon, which the term 'natural selection' captures, therefore can be understood as one of the principal processes governing the relative proportions of the various physical and behavioral traits that are observable in any particular generation of a species. n62 Although rapid changes in environmental conditions can render historically adaptive traits maladaptive, species-typical traits will tend to reflect long-prevailing environmental conditions in that species' ancestry.\par

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n58. See Alcock, supra note 47, at 14-16. \par\par

n59. In other words, the trait might (1) promote reproductive success (as through improved detection of predators); (2) impede reproductive success (as through an urge to run toward, rather than away from, a predator); or (3) have no effect whatsoever on reproductive success (as through introduction of genes that never activate, and therefore have no significance for the organism bearing them). In reality, very few variations are adaptive as there are more ways to worsen something than to improve it. However, because even infrequently occurring adaptive variations tend, on average, to supplant less adaptive alternatives over successive generations, physical structures and behavioral tendencies that most efficiently contribute to individual reproductive success become increasingly prominent. By this process, 'behavioral tendencies which are optimal for maximizing an individual's reproduction become characteristic of the population.' n62 Martin Daly & Margo Wilson, Discriminative Parental Solicitude: A Biological Perspective, 42 J. Marriage & Fam. 277, 278 (1980). \par\par

n60. As Martin Daly and Margo Wilson explain, 'Random variation is ceaselessly generated in populations of reproducing organisms and is then winnowed by nonrandom differential survival and reproduction, with the result that the more successful forms proliferate while their alternatives perish, and adaptive complexity is cumulative over generations.' n62 Martin Daly & Margo Wilson, Evolut

ionary Psychology and Marital Conflict: The Relevance of Stepchildren, in Buss & Malamuth, supra note 30, at 9, 10. \par\par

n61. See Trivers, supra note 47, at 28-29; see also Pinker, supra note 48, at 164 ('22If a mutant produces just 1 percent more offspring than its rivals, it can increase its representation in a population from 0.1 percent to 99.9 percent in just over four thousand generations.'22). \par\par

n62. See Jones, Evolutionary Analysis in Law, supra note 11, at 1137-39, for a useful exercise that helps to clarify this concept. \par

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For present purposes it is important to underscore that natural selection affects species-typical behavioral characteristics, as well as physical ones, because behavior has material causes that lie in the structural properties of the physical brain. n63 Every behavior has consequences, and natural selection therefore operates inexorably upon those genetically influenced behaviors that serve to differentiate individual organisms in ways that affect reproductive success. n64 The significance of this, for the evaluation of the biobehavioral theories of sexual aggression in the next Section, is that evolutionary processes inevitably create species-typical, or in some cases sex-typical or age-typical, evolved psychologies.'22 These are physical, widely shared, information-processing pathways that have probabilistic effects on behavior, or effects that tend to yield some behaviors (in given circumstances) more than others. n65\par

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n63. See Alcock, supra note 47, at 57-88; Michael S. Gazzaniga, Nature's Mind: The Biological Roots of Thinking, Emotions, Sexuality, Language, and Intelligence (1992); Quantitative Genetic Studies of Behavioral Evolution (Christine R. B. Boake ed., 1994); Trivers, supra note 47; Ralph J. Greenspan, Understanding the Genetic Construction of Behavior, Sci. Am., Apr. 1995, at 72, 72-78; A Special Report: Genes and Behavior, 264 Sci. 1686, 1686-1739 (1994) (collection of articles). \par\par

n64. See Robert A. Hinde, Ethology 102 (1982). \par\par
n65. Randy and Nancy Thornhill describe it this way: \par\par

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Psychological adaptations are information-processing mechanisms that provided solutions to information-processing problems that influenced reproductive fitness during human evolution. As a result of selection during long-term human evolution, human psychological adaptations are specially engineered for processing nonarbitrary environmental information and thereby guiding behavior toward adaptive ends.\par

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Randy Thornhill & Nancy Wilmsen Thornhill, Coercive Sexuality of Men: Is There a Psychological Adaptation to Rape?, in Sexual Coercion, supra note 7, at 91, 93. \par\par

These pathways can be extremely context-sensitive. As Tim Goldsmith describes the '22Garcia Effect,'22 rats made ill by x-ray doses delivered after eating will associate their delayed distress with the taste but not with the shape or color of the food. Conversely, if given a shock while eating, rats remember visual or auditory cues, but not taste cues. As a function of natural selection, eating-related cues are far more readily associated with subsequent internal d

istress than auditory or visual cues. See Goldsmith, *supra* note 47, at 97-98. \

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\5B*847\5D Nonetheless, heritable and ultimately species-typical psychologies should not be considered genetically \22determined.\22 Because circumstances vary significantly, an ability to shift among a variety of potential behaviors in response to endlessly shifting environmental conditions is itself adaptive. n66 For example, genetically influenced behavioral algorithms rendering an organism's aggressiveness particularly sensitive to the relative value of the territory it defends (say in food quality and abundance), and to the relative size of any challenger for that territory, tend to increase in frequency over successive generations compared to similar algorithms that cause fleeing or fighting behavior insensitive to the value of guarded territory. Many creatures therefore exhibit relatively simple condition-sensitive or \22conditional\22 strategies that are continuously honed by natural selection. n67 Additionally, in species that have evolved advanced cognitive capacities, behavioral plasticity is further increased by an ability to analyze a very large number of variables, to assess probable outcomes as a consequence of given behaviors, and to choose among them. Our own species is clearly the best example of precisely how adaptive evolved behavioral flexibility can be. It is important to recognize that the existence of such flexibility not only fails to eclipse the influence of condition-dependent predispositions, but is in fact a manifestation and extension of the same evolutionary forces that gave rise to them.\par

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n66. A species' increasing behavioral plasticity inevitably carries its own costs, however, in terms of increased brain size (required by increased computational power), delayed reaction time, and the like. \par\par

n67. See, e.g., Alcock, *supra* note 47, at 404-06, 411-20, 446-47, 622-24. Game theory helps to illuminate the content of these strategies. See, e.g., *Game Theory and Animal Behaviour* (Lee Alan Dugatkin & Hudson Kern Reeve eds., 1998).

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Natural selection, then, is a nondirected yet nonrandom process of differential reproduction. Natural selection leads to evolution when there is genetic variation. Evolution by natural selection tends to make members of existing species look as if they were designed, both physically and behaviorally, to survive and reproduce in the ecological niche in which they have long existed. n68 To understand the \22units\22 of selection on which natural selection operates, it is important to recognize that typically only those traits that at a minimum help individuals to improve their reproductive success can proliferate. Heritable traits that might help the group or species to survive, at the expense of individual gains to reproductive success, would \5B*848\5D generally diminish toward disappearance. n69 This means that under most circumstances natural selection operates primarily at the level of the individual or gene and not at the level of the group. n70 In other words, it is unlikely that traits will arise and persist in individuals if they benefit the group at the expense of an individual's own reproductive success. n71\par

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n68. Richard Dawkins calls evolution by natural selection the "blind watchmaker," as an implicit refutation of the creationist argument that such design implies a conscious designer, in the same way that a watch supposedly implies a watchmaker. See Dawkins, *supra* note 49, at 4-5. Though its influence surrounds us, we know natural selection only by silhouette, as it incessantly eliminates traits carried by organisms that reproduce less successfully than their contemporaries. \par\par

n69. Think, for example, of a heritable trait in deer predisposing its possessors to raise, during times of overpopulation, far fewer offspring than they are physically capable of raising, or of a heritable trait in trees predisposing its possessors to grow less tall - on the chance that all members of the species would benefit by collecting the same amount of sunlight as they do now if they halted their competitive, intraspecies height race. Such traits would be at an extreme disadvantage relative, respectively, to a trait prompting unrestrained reproductive effort, or unrestricted competition for more sunlight. \par\par

n70. See Richard Dawkins, *The Selfish Gene* (1976); Futuyma, *supra* note 47, at 114-31; Hinde, *supra* note 64, at 142-53; Trivers, *supra* note 47, at 67-85. See also George C. Williams, *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought* (1966), which is considered to have eviscerated "naïve" group selectionism as espoused by V. C. Wynne-Edwards in *Animal Dispersion in Relation to Social Behaviour* (1962). But see Elliott Sober & David Sloan Wilson, *Unto Others: The Evolution and Psychology of Unselfish Behavior* (1998), and David Sloan Wilson & Elliott Sober, *Reintroducing Group Selection to the Human Behavioral Sciences*, 17 *Behav. & Brain Sci.* 585 (1994), which argue for limited reintroduction of group selectionism. \par\par

n71. The questions this raises with respect to the evolution of cooperation and altruism are addressed briefly in Jones, *Evolutionary Analysis in Law*, *supra* note 11, at 1146-51, and sources there cited. \par\par

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3. Sexual Selection\par

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Natural selection's relentless sweeping away of individuals with relatively low reproductive success inevitably exposes, like rocks at low tide, a variety of more successful "reproductive strategies" for generating relatives. n72 These are simply the different successful combinations of physiological and behavioral pathways to becoming an ancestor that natural selection has not swept from existence. These include, for example, not only a wide variety of strategies exhibiting different amounts of offspring produced and parental effort invested, but also, importantly, the evolved phenomenon of sexual reproduction itself. n73 For species that reproduce sexually, the process by which evolutionary pressures tend to yield anatomical and behavioral differences between male and female is termed "sexual selection." n74\par

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n72. "Reproductive strategies" is plural here because, while natural selection favors physical structures and behavioral predispositions that together function successfully to transfer genes to subsequent generations, there are many different successful combinations. These vary according to the number of o

ffspring one produces, the extent to which each offspring is cared for after birth, whether reproduction is asexual or sexual, and so forth. See generally sources cited supra note 47. \par\par

n73. See generally Jones, *Evolutionary Analysis in Law*, supra note 11, at 1142-44. \par\par

n74. Darwin first described sexual selection in Chapter IV of *On the Origin of Species by Means of Natural Selection* (1859), and later elaborated on the concept at length in *The Descent of Man and Selection in Relation to Sex* (1871). For modern elaboration, see Goldsmith, supra note 47, at 43-45, 49-67; James L. Gould & Carol Grant Gould, *Sexual Selection* (1989); Anders Pape Møller, *Sexual Selection and the Barn Swallow* 1-17 (1994); Matt Ridley, supra note 47, at 131-69; Trivers, supra note 47, at 203-70; Douglas T. Kenrick & Melanie Trost, *The Evolutionary Perspective*, in *The Psychology of Gender* (Anne E. Beall & Robert J. Sternberg eds., 1993); Robert L. Trivers, *Parental Investment and Sexual Selection*, in *Sexual Selection and the Descent of Man* 136 (B. Campbell ed., 1972). Sexual selection is commonly considered to be a sub-aspect of natural selection, rather than something entirely different. See, e.g., Helena Cronin, *The Ant and the Peacock: Altruism and Sexual Selection from Darwin to Today* 234 (1991). \par

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'5B*849'5D Sexual selection is one of the most critical and empirically robust principles in all of biology, and it is impossible to grasp the logical structure of the biological theories of sexual aggression without understanding it. The phenomenon of sexual selection arises from the simple facts that sexual reproduction requires mating, and mating requires mates. The competition to attract mates and to exclude rivals necessarily imposes evolutionary pressures. These pressures often bring individuals within a species into direct conflict, and often expose areas of conflict even between individuals, such as mated males and females, that have clearly overlapping interests. \par\par

We can explore this phenomenon by example. In any species that has evolved to reproduce sexually, to fertilize internally, and to produce live young, one sex typically must invest more in the creation of a viable offspring than must the other sex. Make no mistake, it is possible (and often preferable from the standpoint of both male and female) for each of the two parents to invest heavily. But the critical aspect here is that there is a concrete difference between the sexes in the minimum investment necessary to an offspring's birth. \par\par

In addition to mating time and energy, for example, the minimum (sometimes sole) male investment is typically sperm itself. On the other hand, if copulation yields conception, the female must continue to invest in the organism growing within her, frequently for long periods. n75 And, in many species, vulnerable young offspring cannot survive without some significant postbirth maternal investment, such as nursing. Following conception in such a species, the male investment, although useful, is neither necessary nor alone sufficient for birth and adequate infant care.\par

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n75. The modern availability of abortion in the human context has no bearing on this point, since only in recent human evolutionary history have females become technologically capable of safely aborting a fetus. \par
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This stark disparity in minimum investment between males and females in such a species produces a corresponding disparity in potential cost-benefit payoffs for every act of copulation. From a single act of copulation, and no more, a male might gain an offspring that carries his genes into future generations. And he is immediately capable of conceiving another, with another female. For the female, in contrast, a single act of copulation might also yield an offspring, but only after it is grown within her, and later nourished (with or without paternal investment). The minimum necessary investment per offspring by females is vast compared to that by males. Internally gestating females are thus bound by the limits of their own bodies. The theoretical maximum number of children a female human could mother, for example, even assuming that each pregnancy brought multiple births, likely hovers near one hundred, with a practical limit probably in the vicinity of thirty. The maximum number of young a male could father, on the other hand, is limited only by the number of females he can inseminate. The theoretical maximum number of children a male human could father might number in the thousands. \par\par

In all species reflecting this disparity in reproductive maxima, the variation in lifetime reproductive success among males is far greater than that among females. Indeed in many mammalian species, such as sea lions, an average male may die without offspring, while the same is virtually never true of the average female. Natural selection therefore inevitably favors behavioral differences between males and females in some reproductive arenas. n76 Because maximum male reproductive success is most limited by access to fertile females (rather than production of sperm), while maximum female reproductive success is most limited by less frequent, lengthier, and more energetically costly reproductive episodes (rather than by sexual access to willing males), two critical features of sexual selection typically emerge: (1) greater male-male than female-female competition for mates; and (2) greater female than male choice, on average over a population, regarding who one's mate will be. n77\par

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n76. See generally Alcock, *supra* note 47; Futuyma, *supra* note 47; Goldsmith, *supra* note 47; Goldsmith & Zimmerman, *supra* note 47; Krebs & Davies, *supra* note 47; Mark Ridley, *supra* note 47; Trivers, *supra* note 47; Daly & Wilson, *Discriminative Parental Solicitude*, *supra* note 47; Bobbi S. Low, *Human Sex Differences in Behavioral Ecological Perspective*, 16 *Analyse & Kritik* 38 (1994); Felicia Pratto, *Sexual Politics: The Gender Gap in the Bedroom, the Cupboard, and the Cabinet*, in Buss & Malamuth, *supra* note 30, at 179, 202-03. For additional explanations, see Matt Ridley, *supra* note 47; Wright, *supra* note 47; Kingsley R. Browne, *Sex and Temperament in Modern Society: A Darwinian View of the Glass Ceiling and the Gender Gap*, 37 *Ariz. L. Rev.* 971, 985-1016 (1995).\i0 \par\par

n77. See Moller, *supra* note 74, at 3. Exceptions prove the rule. In sea horses, for example, in which female seahorses inject eggs into the male's body where they develop, the females are the more active sex in courtship. See Matt Ridley, *supra* note 47, at 180-81. Also, predictably larger and more brightly colored female phalaropes, such as sea snipes, display and fight for males, who, in these bird species, provide the larger share of egg-tending. See Alcock, *supra* note 47, at 499-500; Trivers, *supra* note 47, at 215-19; Wright, *supra* note 47, at 48. The principle remains the same: the sex that can invest less in offspring competes for access to members of the sex that must invest more. \par

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4. The Evolution of Species-Typical Human Behavior\par

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Thus far, it should be clear that persistent patterns in physical and behavioral traits of living things vary as a function of reproductive success. n78 Reproductive success is then, in turn, mediated by the force of natural selection, the pressure of which yields reproductive strategies. Some of these \5B*85I\5D strategies are sexual, resulting in sexual selection, and all involve delicate trade-offs regarding the amount and kind of parental investment. The important point is that these trade-offs introduce into the evolutionary game varying degrees of intraspecies conflict and cooperation, the varieties and combinations of which describe much of the vast diversity of animal behavior. But how do these concepts affect humans?\par

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n78. Recall that \22reproductive success\22 is measured not in offspring, but in copies of genes appearing in relatives. See supra notes 52-53. \par

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To a biologist, all the foregoing is of great significance to the understanding of human behavior. n79 The general, evolutionary processes ordering the existence and persistence of heritable traits, and the increasing or decreasing prominence of these traits among successive populations, are not materially controversial topics within the scientific community. Because all available evidence indicates that these various evolutionary processes have affected all species that ever lived, and because Homo sapiens sapiens is descended from pre-existing species, it is at least clear that these evolutionary processes affected the physical form and behavior of human ancestors at some time. n80 The logic of parsimony mandates a rebuttable presumption that they still do, even if to a lesser degree.\par

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n79. For further background, see sources cited supra note 47. \par\par

n80. See Jones, Evolutionary Analysis in Law, supra note 11, at 1152-55. \par

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For legal thinkers, who are charged in part with designing legal mechanisms to effect specific changes in human behavior, the evolution of distinctly human psychology and behavior means several things. First and foremost, it means that it is pointless to conceptualize any law-relevant behavior as the product of nature or of nurture. Asking whether a particular behavior is the product of nature (genetic influences) or of nurture (environmental influences) is like asking whether the area of a field is determined by its length or by its width. n81 It is necessarily a product of both. Neither nature nor nurture has any meaning, for any organism, except in concert with the other. Similarly, behavior, including human behavior, not only can have but always does have simultaneous proximate (immediate) and ultimate (evolutionary) causes. n82\par

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n81. For cogent attacks on the meaninglessness of the nature versus nurture dichotomy, see Matt Ridley, *supra* note 47, at 175, 316-20; and Paul R. Abramson & Steven D. Pinkerton, Introduction: Nature, Nurture, and In-Between, in *Sexual Nature, Sexual Culture* (Paul R. Abramson & Steven D. Pinkerton eds., 1995).

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n82. 'Proximate' and 'ultimate' are terms of art in biology. For more on their importance, see *infra* text accompanying notes 162-170. On proximate and ultimate causation generally, see Alcock, *supra* note 47, at 2-6; Goldsmith, *supra* note 47, at 3-11, 46-69; John Alcock & Paul Sherman, The Utility of the Proximate-Ultimate Dichotomy in Ethology, 96 *Ethology* 58 (1994); Low, *supra* note 76, at 40-42. \par

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Second, understanding the evolutionary processes affecting human behaviors clarifies that combinations of genes may 'predispose' without rigidly 'determining.' This has consequences for law because we tend to divide people into those 'responsible' for their behaviors and those who are not, as if responsibility is dichotomous, rather than continuous, in the presence of biological influences. It is precisely because evolutionary processes favored behavioral plasticity that (with the exception of reflexes and the like) genes do not generally determine our behavior as if we were 'hard-wired' to respond inevitably to a certain stimulus with a single, corresponding act. The species-typical analytic abilities of our human brains evolved as surely as did the cranial capacity of the skull that shields them. Gene combinations can provide behavioral propensities that simply affect the probability that an organism bearing them will behave in some way. Stated differently, evolutionary processes leave all organisms with many predispositions to respond to environmental stimuli in various fashions - but how strongly the predispositions affect behavior can vary widely among species, individuals, and circumstances. n83

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n83. Moreover, the influence of genes on behavior, though often manifest, is rarely quantifiable with precision, like force, mass, or energy. Because there is no single gene 'for' any complex human behavior, even the presence of genes that increase the likelihood of a behavior never guarantees that it will or will not occur. There is no more a single gene for 'altruism,' for example, than there is for a hand or face. \par

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Third, some behavioral predispositions, including some human ones, are inherited according to definite rules. Because resources are finite at the same time that populations can grow exponentially, the relative proportions within a population of alternative heritable predispositions are inevitably governed by a process of natural selection. That process tends to favor over time those among contemporaneously existing predispositions that more efficiently translate resources into reproduction. That is, when different heritable predispositions unequally influence the reproductive success of the organisms bearing them (includi

ng the reproduction of genetic relatives), those predispositions tending to increase it by the greatest amount will tend to appear in increasing proportions of successive populations. Over many generations, alternative predispositions will tend to dwindle and disappear. We can use this knowledge in making law because it helps us understand the patterned relationships between behaviors that we use the law to change and environmental conditions that law sometimes can control.

Fourth, the economic nature of such competition tends to yield heritable predispositions toward condition-dependent patterns of cooperation and conflict (as well as, incidentally, toward condition-dependent deception, self-deception, and counter-deception). At any given time, most organisms within a species will share certain evolved psychological mechanisms, with predictable variations as a function of such things as age and sex, that will predispose them toward behaviors that were, on average, adaptive for similarly situated organisms during the environment of evolutionary adaptation.

Consequently, understanding the evolutionary processes by which species-typical patterns of information processing came to be as they are today is relevant to the legal system. This relevance turns on the extent to which modern environmental circumstances affect brain operation in ways that tend to increase or decrease the probability of law-relevant behaviors in generally predictable ways. Of course, this contextualized and systemic understanding of human behavior affords law little predictive power about the behavior of a single, identified human individual. (In like fashion, even useful meteorology affords little predictive power about the movement of a single cloud.)⁸⁴ Instead, an understanding of evolved, species-typical human psychology affords very powerful predictions about the patterns that will tend to emerge from the aggregated behaviors of individuals of our species, numbered in the many millions. And, in turn, such an understanding can facilitate social and legal changes to a population's environment in ways intended to effect changes in the incidence of those behaviors.

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⁸⁴. I am grateful to David Faigman for this metaphor. See David L. Faigman, To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy, 38 Emory L.J. 1005, 1047 (1989) ("Meteorology is another example of the value of even uncertain predictions.").

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C. Biobehavioral Theories of Rape

This review of the history of rape theories and the basic principles of behavioral biology leads us to the matter at hand, the biobehavioral theories of rape. Alert readers will question whether the word "rape," with its many nuanced manifestations and meanings, can and should be used in nonhuman contexts. This is a good question. In the end, I have elected to use "rape" for reasons best explored in the footnote below.⁸⁵ Generally, I shall use the word "rape" to refer only to male behavior that forces an unwilling female to engage in copulation.

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⁸⁵. Scholars have debated this issue at length. For an overview, see Craig

T. Palmer, Rape in Nonhuman Animal Species: Definitions, Evidence, and Implications, 26 J. Sex Research 355 (1989). For the view that 'rape' should only be used in reference to humans, see, for example, Philip Kitcher, Vaulting Ambition: Sociobiology and the Quest for Human Nature 184-89 (1985); Larry Baron, Does Rape Contribute to Reproductive Success? Evaluation of Sociobiological Views of Rape, 8 Int'l J. Women's Stud. 266 (1985); Blackman, supra note 45, at 115; Daniel Q. Estep and Katherine E.M. Bruce, The Concept of Rape in Non-Humans: A Critique, 29 Animal Behav. 1272 (1981); Donald F.J. Hilton, Is It Really Rape or Forced Copulation?, 32 BioSci. 641 (1982); Ruth Hubbard, The Political Nature of 'Human Nature', in Theoretical Perspectives on Sexual Difference 63, 67 (Deborah L. Rhode ed., 1990); and sources cited in Thornhill & Palmer, supra note 14, at ch. 1. For the view that 'rape' can refer to forced copulation in both humans and other animals, see, for example, Charles Crawford & Birtute M.F. Galdikas, Rape in Non-Human Animals: An Evolutionary Perspective, 27 Can. Psychol. 215 (1986).

'Forced copulation' and 'sexual coercion' are among the suggested alternatives, and neither they nor 'rape' have found universal acceptance. I take no independent position in this debate. I use 'rape,' however, for four reasons. First, it is shorter and less unwieldy than 'forced copulation,' and more specific than 'sexual coercion.' Second, lawyers are accustomed to seeing words defined to mean precisely what the drafter wants them to mean, and little more, in different contexts. So I trust that if I define my term adequately, its meaning can be limited and understood. Although I need some word to refer to the behavior itself, I do not intend to diminish the obviously unique meaning and political significance that rape has in the human context. Third, while I recognize (as all do) the sin of anthropomorphizing nonhuman behavior, I am persuaded that the inverse - what Frans de Waal terms 'anthropodenial' (the overzealous rejection of likely commonalities in behavioral processes between humans and other animals) - is an equally insidious danger, equally likely to flaw analysis. See Frans de Waal, Are We in Anthropodenial?, Discover, July 1997, at 50. Fourth and finally, I consider it persuasive that noted evolutionary biologist and feminist Sarah Blaffer Hrdy also uses the term 'rape' in both human and nonhuman contexts. See Sarah Blaffer Hrdy, The Woman That Never Evolved 18 (1981) (referring to orangutan rape). For a brief description of the criteria by which a female's unwillingness to mate may be inferred, see infra text accompanying note 103.

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Randy Thornhill, the leading rape researcher in biology, has explained that there are conceivably four very different kinds of biological theories about how evolutionary processes might influence rape. n86 Because he and other biologists consider three of these four highly unlikely, I do not explore those at any length here. n87 The fourth of the four general kinds discussed below reflects the logic of natural and sexual selection introduced in the prior Section, particularly the effects of between-sex variance in copulation costs and benefits, and is itself susceptible of two alternative forms. Specifically, selection for rape-influencing psychological characteristics could theoretically arise: (1) by direct selection (the so-called 'adaptation' hypothesis); and (2) by indirect selection (the so-called 'by-product' or 'incidental effect' hypothesis). n88 We consider these in sequence, and postpone brief evaluation of them to Part II.\par

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n86. See Randy Thornhill, *The Biology of Human Rape*, 39 *Jurimetrics J.* 137 (1999).

n87. These three involve mutation-selection balance, evolutionarily novel environments, and genetic drift. They are each summarized *infra* Appendix B.

n88. Useful discussion of the distinctions between adaptations and by-products of other adaptations appears in Thornhill & Palmer, *supra* note 14, at ch. 1. Useful discussion of the same in the context of the evolutionary theories of rape appears in Craig T. Palmer, *Human Rape: Adaptation or By-Product*, 28 *J. Sex Res.* 365 (1991).

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1. The Adaptation Hypothesis

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Theoretically, a psychological, information-processing predisposition toward contingent (context-specific) rape behavior could spread by natural selection if it were adaptive. That is, it could spread if, across all males bearing the predisposition, it had a net positive effect on the average male reproductive success in the environment of evolutionary adaptation. n89 The reasons for this trace to natural and sexual selection. Because indiscriminate copulation is more costly, on average, to females than to males (because males, but not females, can avoid the costs of internal gestation), natural selection has generally favored copulation-partner choosiness in females of internally fertilizing species.

Selective females make better use of a limited number of lifetime reproductive episodes. Because males, but not females, can increase reproductive success by increasing the number of partners with whom they copulate, natural selection has generally disfavored an equivalent choosiness in males about partner quality per copulation.

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n89. See each of the Thornhill citations appearing *infra* Appendix A.

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This means that the different average costs to males and females of copulating together have yielded different male and female psychologies, on average, concerning willingness to copulate indiscriminately (particularly with strangers).

n90 To biologists, this is not just speculation. It is extremely unlikely that the cumulated economic effects of natural and sexual selection, across at least 600 million years of sexual reproduction in our ancestry, could have generated male-typical and female-typical psychologies that happen to be identical in all respects. n91

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n90. The existence of differences between male and female psychologies does not, of course, suggest that either is superior or inferior. See, e.g., David M. Buss, *Sexual Conflict: Evolutionary Insights into Feminism and the 'Battle of the Sexes'*, in Buss & Malamuth, *supra* note 30, at 296, 305. For example, this does not suggest that there will be important differences between men and women in intelligence, initiative, or administrative and political capabilities.

lities.²² Hrdy, *supra* note 85, at 190. \par\par

n91. See Buss, *supra* note 90, at 301. \par

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We can therefore expect that unmated males and females in ancestral environments came into conflict when, for example, a male wanted to copulate with a female who did not want to copulate with him. In such a circumstance, a forced copulation could in effect increase male mate number, potentially increasing male reproductive success. But this gain would have come at the cost to the female of female mate-choice, potentially decreasing her lifetime reproductive success, compared to reproductive success she would likely have obtained had she copulated all her life only with males of her own choosing. n92\par

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n92. See Thornhill, *supra* note 86, at 144. To see this, remember that reproductive success is not measured simply by how many offspring a female has. It necessarily takes into account the relative quality of those offspring (quality being affected by the father's, as well as the mother's, genetic contributions), and the extent to which higher quality offspring can increase her reproductive success by themselves attracting high-quality mates and producing high-quality offspring. See *supra* notes 52-53. \par

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The mindless and thoroughly amoral effects of natural and sexual selection are therefore such that our here-hypothesized evolved male predisposition toward contingent rape behavior could spread to more and more males in each ensuing generation. For when the results of rape increased a raping male's reproductive success even marginally (compared either to not copulating at all, or to copulating only with willing females) a predisposition increasing the probability of forced copulation in certain contexts could appear in more and more males in successive generations. n93 Put another way, males in ensuing generations would be increasingly likely to be descended from males that had heritable psychological mechanisms prompting conditional switches among mating behaviors: court when the prospects are good, and force copulations either when the benefits are high (as when willing females are not forthcoming) or when the costs are low (as when the likelihood of injury or reprisals is very low). n94 Obviously, these mating behaviors, among which males would switch, would exist on a continuum, bounded by great investments in courtship at one end and varying across infinite gradations of increasing psychological and physical coerciveness toward the other end, bounded by rape.\par

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n93. A variant on this hypothesis suggests that rape may be an evolved male mechanism unrelated to fertilizations in the present, but facilitating control over a female to increase the chances of fertilization in the future. See Richard Wrangham & Dale Peterson, *Demonic Males: Apes and the Origins of Human Violence* 141 (1996); Barbara B. Smuts & Robert W. Smuts, *Male Aggression and Sexual Coercion of Females in Nonhuman Primates and Other Mammals*, 22 *Advances Study Behav.* 1 (1993). \par\par

n94. For yet another variation on this hypothesis, see Linda Mealey, *Sex Dif*

ferences: Developmental and Evolutionary Strategies (forthcoming 1999); Thornhill & Palmer, supra note 14, at ch. 2; Linda Mealey, Alternative Adaptive Models of Rape, 15 Behav. & Brain Sci. 397 (1992).

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A significant corollary to this reasoning is that because of the disparity in costs to males and females of forced copulation, if forced copulation were a significant risk to ancestral females across evolutionary time, natural selection would have favored a counterstrategy in females: acute psychological predispositions toward avoiding and resisting forced copulation. In succeeding generations within any internally fertilizing species, an increasing proportion of females would be descended from females who happened to have psychological predispositions to avoid and resist rape. That is, to the extent that female-chosen males sired more reproductively successful offspring, on average, than did raping males, any heritable indifference to rape risk would inevitably dwindle toward disappearance, leaving future generations of females with an extremely strong, extremely specific, and sex-wide psychological distaste for rape.

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n95. The general idea is that human mental pain is an adaptation that is designed to guide cognition, feelings, and behavior toward solutions to personal social problems that reduced inclusive fitness in human evolutionary history, and to provide inferences for avoiding such problems later in life. Randy Thornhill, Rape-Victim Psychological Pain Revisited, in Human Nature 239, 239 (Laura Betzig ed., 1997) (hereinafter Randy Thornhill, Rape-Victim Psychological Pain).

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This hypothesis views the evolutionary significance of mental pain as analogous to the evolutionary importance of physical pain. Physical pain serves to draw an individual's attention to some aspect of anatomy that needs tending and can be fixed by the individual's attention. Mental pain seems to focus an individual's attention on the significant social events surrounding the pain and promotes correction of the events causing the pain and avoidance of these events in the future. The hypothesis of psychological pain makes the following two general predictions about the kinds of environmental information that will result in psychological pain: First, it predicts that the proximate ecological causes of mental pain will be circumstances that affected inclusive fitness of individuals under social competition. Second, the hypothesis predicts that the more an event potentially or actually negatively affects the evolved social tendencies, desires, and aspirations of humans, the more psychological pain will occur surrounding the event.

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Nancy Wilmsen Thornhill & Randy Thornhill, An Evolutionary Analysis of Psychological Pain Following Rape: I. The Effects of Victim's Age and Marital Status, 11 Ethology & Sociobiology 155, 158-59 (1990) (hereinafter Thornhill & Thornhill, Psychological Pain I). See generally Nancy Wilmsen Thornhill & Randy Thornhill, An Evolutionary Analysis of Psychological Pain Following Human (Homo sapiens) Rape: IV. The Effect of the Nature of the Sexual Assault, 105 J. Comp. Psychol. 243 (1991) (hereinafter Thornhill & Thornhill, Psychological Pain IV); Nancy Wilmsen Thornhill & Randy Thornhill, An Evolutionary Analysis of

Psychological Pain Following Rape: III. Effects of Force and Violence, 16 Aggressive Behav. 297 (1990) \5Bhereinafter Thornhill & Thornhill, Psychological Pain III\5D; Nancy Wilmsen Thornhill & Randy Thornhill, An Evolutionary Analysis of Psychological Pain Following Rape: II. Effects of Stranger, Friend, and Family-Member Offenders, 11 Ethology & Sociobiology 177 (1990); Thornhill & Thornhill, Psychological Pain I, supra; Randy Thornhill & Nancy Wilmsen Thornhill, The Evolution of Psychological Pain, in Sociobiology and the Social Sciences 73 (Robert W. Bell & Nancy J. Bell eds., 1989). The potential reduction in female reproductive success following rape is concisely summarized in Thornhill & Palmer, supra note 14, at ch. 4. \par

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2. The By-Product Hypothesis\par

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The by-product (or \22incidental effect\22) hypothesis can be stated more succinctly. Whereas the adaptation hypothesis contemplates the existence of heritable psychological features specific to rape, the by-product hypothesis contemplates a process by which natural selection could affect patterns of forced copulation indirectly. Specifically, this model's proponents argue that rape may persist within a species not because forced copulation was itself specifically adaptive, but rather because forced copulation was a by-product of adaptations to other generalized behavior that is, on average, adaptive for the organisms bearing them. n96 For example, if eager pursuit of possible sex partners on average increases reproductive success, and if such pursuit occasionally results in nonconsensual sex (even at some cost to the raping male) then rape behavior could be a by-product of a psychology evolved by direct selection to pursue eagerly, and persist in obtaining, possible sex partners. n97 It is worth noting that female psychological aversion to rape could be a rape-specific adaptation at the same time that biobehavioral contributions to rape itself are by-products of other adaptations.\par

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n96. See Thornhill, supra note 86, at 144. \par\par

n97. See id. This hypothesis seems to have been posed first in Donald Symons, The Evolution of Human Sexuality 284 (1979). \par

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II Biobehavioral Perspectives on Rape: Predictions and Data\par

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The relevance, if any, of these theories to legal thinkers must depend on the extent to which they are robust. Scientific method requires that theories offer explanations consistent with relevant and already observed phenomena, as well as testable forecasts of patterns in data not yet observed (together, herein, the \22predictions\22). n98 One then gathers data by observation \5B*858\5D and also, where possible, by experimentation. Robust theories, to be accorded in some measure at least temporary status as \22true,\22 n99 are those for which the data fit the predictions, and which are consistent with theories previously judged to be very robust. Where the data are judged to fit predictions of two or more theories equally well, scientific method mandates that one both generally prefer the simpler (more parsimonious) of the two theories, n100 and meanwhile attempt to derive even more discriminating testable predictions as t

o which the candidate theories differ.\par

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n98. See Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* 37 (5th ed. rev. 1992) ('The criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.'), quoted with approval in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593 (1993).¹⁰ In select contexts, the word 'predictions' carries a strictly chronological meaning, referring only to statements about observations not yet made. I here invoke the more common meaning of predictions - of general statements, logically derived from the premises of the theories, about the likelihood that specified circumstances will obtain, whether or not such circumstances have been observed previously. \par\par

n99. Technically, one never proves that anything is always true (because no number of white swans can prove that there are no black swans). Whereas one can, with a single example to the contrary, prove that something is not always true (a single black swan proves that not all swans are white). For classic articulations of this principle, see generally Popper, *supra* note 98. See also Karl R. Popper, *The Logic of Scientific Discovery* (1959). \par\par

n100. See generally Carl Hempel, *Philosophy of Natural Science* 40-45 (1966).

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The biobehavioral theories of rape articulated above generate a series of narrow, testable predictions. Those theories will be worth considering in future legal scholarship in direct proportion to the number of predictions supported by the data and the closeness of the 'fit' between the predictions and the data. My purpose at present is not to compile all the predictions and all the data, as if to prove definitively or disprove the biobehavioral theories. Not every prediction in the literature is strongly supported, and further research is advisable. Rather, this Part summarizes some of the most intriguing and important findings testing the biobehavioral predictions, in an effort to permit a preliminary assessment of the plausibility of the theory that natural and sexual selection have influenced patterns of rape behavior in humans. For if they did, our knowledge of this biobehavioral 'truth' may afford law more leverage against rape behavior. \par\par

Because the adaptation and by-product hypotheses generate many of the same predictions, they currently afford little empirical reason to favor one over the other (indeed, it is possible that the two causal pathways can operate both independently and in concert).¹⁰¹ However, the specificity and number of the predictions nonetheless probe the extents to which biobehavioral influences affect patterns of rape. If either selection theory accurately describes a process by which male and female brains may differ, on average, in their processing of encounters when forced copulations might occur, then these testable hypotheses, among numerous others, follow.¹⁰²\par

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n101. See Thornhill & Thornhill, *supra* note 65, at 91 ('Current knowledge of the coercive sexuality of men is consistent with this hypothesis that the sexual psychology of men contains psychological design for the purpose of rape' but cannot demonstrate adaptation to rape.) (emphases added); Nancy

Wilmsen Thornhill, Psychological Adaptation to Sexual Coercion in Victims and Offenders, in Buss & Malamuth, supra note 30, at 90, 101-02 ('Current knowledge of men's sexual behavior does not provide evidence of psychological adaptation to rape itself. It seems likely that the occurrence of coercive sexual behavior by men could as easily be the combined effect of species-typical adaptation to coerce desired rewards and sex-specific adaptation for sexual behavior.').²²; see also David M. Buss, The Evolution of Desire 162-63 (1994); Palmer, supra note 88, at 379.

I have attempted to render these selected predictions easily accessible to a legal audience. Most of them summarize more technical language appearing in various primary sources, such as the works of Randy Thornhill, Nancy Thornhill, and Craig Palmer, listed infra Appendix A, as well as Lee Ellis, Gene-Base and Evolutionary Theories in Criminology, 35 Criminology 229, 234-38 (1997), and Neil M. Malamuth, An Evolutionary-Based Model Integrating Research on the Characteristics of Sexually Coercive Men, in 1 Advances in Psychological Science: Social, Personal, and Developmental Aspects 151 (John G. Adair et al. eds., 1998).

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A. Predictions and Data

Prediction 1: Females (particularly in internally gestating species) will be choosier than males about copulation partners - avoiding and resisting copulation with males they have not affirmatively selected.

Rationale: The cost to females of random copulation is greater than that to males, so natural and sexual selection will favor predispositions, in females, to choose mates and to resist rape.

Data: This prediction is overwhelmingly supported.¹⁰³ In all species, including humans, in which forced male-female copulation has been observed to date, there is a marked distinction between willing and unwilling female behavior. Unwillingness, obviously, must be inferred; researchers describe the female as unwilling if the precopulatory and copulatory behavior is statistically rare and involves, for example, a female's avoiding particular males, attempting to flee, struggling when caught, and attempting to prevent intromission.

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¹⁰³. For overviews of sexual selection, see Malte Andersson, Sexual Selection (1994); Cronin, supra note 74; Daly & Wilson, supra note 47. For human studies, see, for example, David M. Buss, Sex Differences in Human Mate Preferences: Evolutionary Hypotheses Tested in 37 Cultures, 12 Behav. & Brain Sci. 1 (1989); Low, supra note 76.

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Prediction 2: It is unlikely that rape behavior is confined to the human species.

Rationale: If a predisposition toward increasingly persistent, even aggressive, sexuality ever arose, and if it afforded males bearing it even a small reproductive advantage over less persistent males, that predisposition would spread widely throughout subsequent populations. While such a predisposition can spread only under ecological conditions enabling it to contribute to male reproductive success, it is unlikely that such ecological conditions occur only in human

s. \par\par

\5B*860\5D Data: Biologists have long studied examples of unequivocally forced copulations across the animal kingdom. n104 Thus far, the behavior is already widely observable, in both natural and laboratory conditions, in species ranging from our closest primate relatives n105 (including orangutans, n106 chimpanzees, n107 and gorillas n108) to more distant primates, n109 other mammals, n110 birds, n111 and insects. n112\par

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n104. See generally Thornhill & Palmer, *supra* note 14, at ch. 6 (reviewing literature); Crawford & Galdikas, *supra* note 85 (concluding there is considerable evidence for the existence of rape in other species); Palmer, *supra* note 85 (reviewing studies of insects; birds; fish; frogs, toads, and lizards; a worm species; plants; elephant seals; and several nonhuman primates; and concluding that rape appears to take place in all but the worms and plants). \par\par

n105. See, e.g., Wrangham & Peterson, *supra* note 93, at 138 (discussing rape in apes); Lee Ellis, *Neodarwinian Theories of Violent Criminality and Antisocial Behavior: Photographic Evidence from Nonhuman Animals and a Review of the Literature*, 3 *Aggression & Violent Behav.* 61, 67 (1998) (citing studies); Nadler, *supra* note 13; Ronald D. Nadler, *Sexual Aggression in the Great Apes*, 528 *Annals N.Y. Acad. Sci.* 154 (1988) (finding sexual aggression among chimpanzees, orangutans, and gorillas in both natural and laboratory conditions). To date, no one has observed rape among the bonobos. See Frans de Waal, *Keynote Address to the Human Behavior and Evolution Society in Tucson, Arizona* (June 6, 1996); Personal Communication with Prof. Richard Wrangham (Nov. 12, 1998). \par\par

n106. See Wrangham & Peterson, *supra* note 93, at 132-43 (summarizing data on orangutan rapes). Among wild orangutan populations, rape accounts for one-third to one-half or more of all copulations. See *id.* at 142. Among the important primary sources are H.D. Rijksen, *A Fieldstudy of Sumatran Orangutans* (1978); Birute M.F. Galdikas, *Adult Male Sociality and Reproductive Tactics Among Orangutans at Tanjung Puting*, 45 *Folia Primatologica* (1985) (finding that smaller males are less attractive to females and more likely to attempt rape); Birute M.F. Galdikas, *Orangutan Adaptation at Tanjung Puting Reserve: Mating and Ecology*, in *The Great Apes* 195 (David A. Hamburg & Elizabeth R. McCown eds., 1979); John MacKinnon, *Reproductive Behavior in Wild Orangutan Population*, in *The Great Apes*, *supra*, at 257; John C. Mitani, *Mating Behaviour of Male Orangutans in the Kutai Game Reserve, Indonesia*, 33 *Animal Behav.* 293, 396 (1985); Ronald D. Nadler, *Laboratory Research on Sexual Behavior of the Great Apes*, in *Reproductive Biology of the Great Apes* 191 (Charles E. Graham ed., 1981); Ronald D. Nadler, *Sexual Behavior of Orangutans (Pongo Pygmaeus): Basic and Applied Implications*, in *The Neglected Ape* 223 (Ronald D. Nadler et al. eds., 1995) \5Bhereinafter Nadler, *Sexual Behavior of Orangutans*\5D. \par\par

n107. See Nadler, *supra* note 105, at 154; see also Wrangham & Peterson, *supra* note 93, at 7, 138, 142, 151. \22Even among chimpanzees, where rape is a good deal rarer, it probably still happens as often as among many human populations.\22 *Id.* at 142. \par\par

n108. See Nadler, *supra* note 105; Wrangham & Peterson, *supra* note 93, at 138. \par\par

n109. See Robert Jay Russell, *The Lemurs' Legacy: The Evolution of Power, Sex, and Love* 138 (1993) (reporting that rape is not uncommon among lemurs); Wrangham & Peterson, *supra* note 93, at 138 (reporting observation of rape in wild howler monkeys). \par\par

n110. See, e.g., Ellis, *supra* note 105, at 67 (citing studies); Palmer, *supra*

a note 85, at 365-66 (elephant seals). \par\par

n111. See, e.g., T.R. Birkhead & A.P. Møller, Sperm Competition in Bird
s: Evolutionary Causes and Consequences (1992); Alan D. Afton, Forced Copulation
n as a Reproductive Strategy of Male Lesser Scaup, 92 Behav. 146 (1985); Stephen
n T. Emlen & Peter H. Wrege, Forced Copulations and Intra-Specific Parasitism:
Two Costs of Social Living in the White-Fronted Bee-Eater, 71 Ethology 2 (1986)
(white-fronted bee-eaters); id. at 20 (citing studies of forced copulations in
albatrosses, cormorants, herons and egrets, gulls, swallows, and purple martin
s); Douglas E. Gladstone, Promiscuity in Monogamous Colonial Birds, 114 Am. Nat
uralist 545 (1979) (cataloguing a number of species in which forced copulation
occurs outside the pairbond); Pierre Mineau & Fred Cooke, Rape in the Lesser Sn
ow Goose, 70 Behav. 280 (1979). \par\par

n112. See Randy Thornhill, Rape in Panorpa Scorpionflies and a General Rape
Hypothesis, 28 Animal Behav. 52 (1980); see also Wrangham & Peterson, supra not
e 93, at 138-39. Indeed, some insects, such as scorpionflies and some water-str
iders, have physical organs used only during attempts at forced copulation. See
Thornhill & Palmer, supra note 14, at ch. 3, ch. 6. \par

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\5B*861\5D Prediction 3: Rape will rarely result in fatal harm, or harm
sufficient to preclude conception and birth. \par\par

Rationale: The more heritable rape behavior precluded birth, the more natura
l selection would have disfavored it. \par\par

Data: In both nonhuman and human animals, it is extremely rare for raped fem
ales to be killed, and quite rare for them to be injured in ways that prevent p
ossible conception and birth. In humans, rape-murders are exceedingly rare n113
(for example, occurring in only 7 rapes out of 1223 in one study, and 1 of 646
in another study). n114 According to a recent report by the National Victim C
enter, over two-thirds of rape victims report no physical injuries, 24% report
minor physical injuries, and only 4% sustain serious physical injuries. n115\pa

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n113. Statistics, of course, vary. But all agree that the proportion of rape
-murders to all rapes is extremely low. See, e.g., Brownmiller, supra note 35,
at 198 (noting that only about 0.2% - or 1 in 500 - rape victims are murdered);
DOJ Statistics, supra note 6, at 12 (noting that only about 1% of all murders
involve rape; and that only 5% of victims \22suffered a major injury such as s
evere lacerations, fractures, internal injuries, or unconsciousness\22); Gordo
n & Riger, supra note 2, at 9 (noting that only 3% of rape victims are murdered
); Richard T. Rada, Psychological Factors in Rapist Behavior, in Clinical Aspec
ts of the Rapist, supra note 32, at 51 (\22Rapists rarely murder <Elip>\22).
Professor Katherine Baker has pointed out that it would be useful to know how t
he proportion of rape-murders to all rapes compares to the proportion of robber
y-murders to all robberies, and mugging-murders to all muggings. Personal Commu
nication with Katherine Baker (Sept. 3, 1998). \par\par

n114. See Sedelle Katz & Mary Ann Mazur, Understanding the Rape Victim 163-6
4 (1979). \par\par

n115. See National Victim Center, Forcible Rapes, Rape in America: A Report
to the Nation (1992). \par

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Prediction 4: Rape will be overwhelmingly a male, rather than female, behavior. \par\par

Rationale: A male's reproductive success, far more than a female's, can be increased by increasing the number of partners with whom he copulates. Natural selection would therefore favor forced copulation by males more than it would favor forced copulation by females. \par\par

Data: In all species in which forced male-female copulation has been observed, the behavior is almost without exception committed by males upon females, rather than vice versa. n116 For example, female physical sexual coerciveness \5B*862\5D (of any kind) of unwilling males in human societies is virtually unknown. It may be tempting to attribute the strong sex bias among perpetrators to anatomical differences alone. However, the same bias is present even in species lacking larger and stronger males. And the bias similarly obtains not only among species such as mammals in which an aroused penis is generally necessary for copulation, but also among species such as birds in which males have no penises. Moreover, the pan-species sex differences in anatomical capacity to rape themselves require evolutionary explanation.\par

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n116. See Crawford & Galdikas, supra note 85, at 227 ('22All known cases of forced matings are by males.'22); Goldsmith, supra note 47, at 61. On the overwhelming predominance of males among human rapists, see, for example, James T. Tedeschi & Richard B. Felson, Violence, Aggression, & Coercive Actions 310 (1994) ('22We can think of no other type of coercive behavior, and few other non-coercive behaviors, in which the sex difference is so strong.'22); Ellen G. Cohen, The Prediction of Police Calls for Service: The Influence of Weather and Temporal Variables on Rape and Domestic Violence, 13 J. Envtl. Psychol. 71 (1993).

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Prediction 5: The likelihood of rape, by a given male, will be context-specific and will vary with environmental contingencies in a way that reflects the relative benefits of alternative mating behaviors. \par\par

Rationale: Copulation with willing partners will generally be less costly to males than forced copulations. Selection would therefore favor a context-specific predisposition, if it arose, that increased the likelihood of aggression as the likelihood of willing copulation decreased. n117\par

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n117. In some species, individuals employ a single mating behaviour throughout their lives. Individuals in other species have the potential to employ different mating behaviors, sensitive to environmental circumstances. Or, as Crawford and Galdikas put it, '22The members of some species exhibit conditional sexual strategies. All individuals carry genes for all strategies; the particular sexual strategy employed depends on factors such as what the individual's competitors are doing, resources available to the individual, and the individual's size and aggressiveness.'22 Crawford & Galdikas, supra note 85, at 220 (citing Krebs & Davies, supra note 47). \par

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Data: To demonstrate that an evolved predisposition toward aggressive sexual
ity or rape can be highly contingent, one compelling example would suffice. As
it turns out, there are many. Discussed below are two, selected to illuminate o
pposite extremes of cognitive capacity. The scorpionfly (an insect species) dem
onstrates how little brainpower it takes to harbor a sophisticated, environment
ally sensitive, decisional algorithm. The orangutan (one of the planet's smarte
st species) demonstrates how a similar algorithm is likely present among near-r
elatives of humans. n118\par

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n118. See generally Thornhill, supra note 112; Randy Thornhill et al., The B
iology of Rape, in Tomaselli & Porter, supra note 30, at 102, 108-09; Alcock, s
upra note 47, at 446-47. \par

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Rape in Scorpionflies\par

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In the scorpionfly, females generally flee from males who do not offer resourc
es, such as a dead insect (the female preference) or a salivary mass (an accept
able second-best created by the male). n119 Males can therefore copulate in th
ree ways: (1) guarding a dead insect, which attracts a female, who mates willin
gly; (2) creating and guarding a salivary mass, which attracts a female, who ma
tes willingly; and (3) grabbing a female and attempting to force copulation. n1
20 All three techniques have been observed.\par

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n119. See Thornhill, supra note 112, at 53. \par\par

n120. See id. at 53 (\22If grasped by such a male's genital claspers, femal
es fight vigorously to escape. When the female's wings are secured, the male at
tempts to grasp the genitalia of the female with his genital claspers. The fema
le attempts to keep her abdominal tip away from the male's probing claspers.\2
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In a significant experimental study, Randy Thornhill demonstrated that these
three mating strategies are part of one conditional strategy, not three altern
ative strategies reflecting three mutually exclusive genetic predispositions. T
hat is, a given male will predictably adopt one of these three strategies, depe
nding on circumstances, and switch among them as circumstances change. n121 Typ
ically, the number of females with whom a male scorpionfly can copulate decreas
es from insect offering, to saliva offering, to rape, in parallel with decreasi
ng male size and concomitant decreased ability to best other males in contests
for food offerings. When the large males defending the few insect offerings wer
e experimentally removed, the medium-sized males that had previously offered sa
liva switched over to defend the insects, and the smallest males, which had pre
viously raped, promptly took over the salivary masses thus abandoned, subsequen
tly copulating with willing females. n122\par

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n121. See id.; see also Alcock, supra note 47, at 446-47. \par\par

n122. A useful summary of the experiment appears in John Alcock, *Animal Behavior: An Evolutionary Approach* 418-19 (5th ed. 1993). Alcock writes, \par\par

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In competing for '5Bdead insects'5D, the larger males won, and as a result, averaged nearly six copulations each. Medium-sized males generally attempted to lure mates with salivary gifts, but were much less successful (gaining about two copulations per male). Small males were unable to claim '5Bdead insects'5D and appeared incapable of generating sufficient saliva to attract females. They employed the forced copulation route but were the least successful of all (averaging only about one copulation per male).\par

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Id. \par

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The significance of this study for present purposes, notwithstanding the obvious differences between humans and insects, is two-fold. It conclusively demonstrates the '5B*864'5D existence of a highly specialized rape contingency behavior. It also demonstrates that large brains are not required for sophisticated, algorithmic predispositions such as: '22If in possession of a dead insect, court; if no insect, spit and court; if no success, attempt rape; repeat.'22 That is, within a very tiny, nonsentient brain, conditional mating predispositions can evolve, and '22male '5Bscorpionflies'5D are able to adopt whichever of the three tactics returns the highest possible rate of copulations, given the nature of the competition they face at that moment.'22 n123\par

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n123. Id. at 419. \par

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Rape in Orangutans\par

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Male orangutans also appear to vary their sexual behavior, from solicitous to forceful, according to circumstances. Although a great deal of orangutan mating in the wild appears to be consensual, it is also well-documented that male orangutans (particularly those small enough to pursue the typically smaller females onto slender tree branches) often rape females. n124 In addition, when the male orangutan's ability to flee an approaching male is experimentally manipulated in captivity, the very same male orangutan who will be extremely unaggressive and solicitous of a female who can physically escape him, will generally grab and rape a struggling female if she cannot escape him. n125 Although one of course must be careful '5B*865'5D when attempting to generalize from the behavior of captive animals, these experiments strongly suggest that psychological mechanisms mediating conditional, context-specific mating tactics may have evolved among species with advanced cognitive capacities, as well as among less cognitively advanced species.\par

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n124. See supra note 106. One orangutan even raped a human female, while her friend looked on, powerless to stop him. See Wrangham & Peterson, supra note 93, at 137-38. \par\par

n125. See, e.g., Nadler, supra note 105. Nadler found that '22although sexual aggression is relatively rare among mature great apes in their natural habitats, it does occur to some degree.'22 Id. at 158. His lab work revealed extremely context-specific rape behavior. In '22Free Access Tests'22 (FATs) males and females were housed together. In '22Restricted Access Tests'22 (RATs), each female, but no males, could control when male and female would mingle. In lab conditions, subjects mated more than in the wild. But the interesting finding is that \par\par

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in all three species <elip> the increased copulation appears to result from increased male sexual initiative (aggression), male dominance over females, and the inability of the female to avoid or escape from the male within the limited spatial conditions of the free-access test. This interpretation is supported by studies using restricted-access tests in which females control sexual access. These data suggest that male sexual aggression in our closest biological affiliates commonly occurs when females are rendered vulnerable to the male by the absence of the normal social constraints and spatial prerogatives typical of the natural habitat.\par

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Id. at 161. \par\par

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The data on these species of great apes are similar in revealing that (1) sexual aggression is carried out to some extent by males of all these species under natural conditions, albeit relatively infrequently; and (2) sexual aggression occurs at increased frequencies in FATs conducted in the laboratory as a consequence of test conditions that compromise the females options for regulating sexual interactions. These data support the interpretation that sexual aggression to some degree is an inherent characteristic of the behavioral repertoires of our closest biological affiliates and that conditions that render the females vulnerable to such aggression lead to its increased occurrence.\par

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Id. at 160; see also Nadler, Sexual Behavior of Orangutans, supra note 106. Female-controlled laboratory tests quickly '22revealed that fully adult males that had never displayed nonaggressive form of sexual solicitation, quickly began to display this behavior when they were prevented from pursuing the females as they had always done.'22 This suggests this form of behavior is '22highly responsive to environmental conditions.'22 Id. at 234 (emphasis added). \par\par

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John Mitani witnessed 179 matings; 88% were '22forced'22 and '22involved protracted struggles between females and males,'22 in which '22females whimper, cry, squeal and grunt'22 while males '22had to grab, bite or slap females before they could copulate. While thrusting, males continued to restrain struggling females by grasping their arms, legs and bodies.'22 Mitani, supra note 106, at 396. \par

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Prediction 6: The ages of victims of attempted and completed rape will be overwhelmingly concentrated into the part of the female lifespan that is reproductive. \par\par

Rationale: Copulation with females outside the age range historically bounded by puberty and menopause is unlikely to result in reproduction and is therefore more costly. Natural selection would consequently favor male predispositions to copulate, on average, with fertile-aged females. \par\par

Data: This prediction is overwhelmingly supported, in both nonhuman and human species. n126 In humans, the consistency of the data with the prediction is particularly striking. The mean age of rape victims in most data sets is twenty-four years old. n127 Studies consistently show that although women of all ages have been raped, victims of forced copulation are overwhelmingly likely to be in their peak reproductive years, between thirteen and thirty-five. n128 \5B*866\5D (And the data collected on \22child\22 victims, often defined as girls under the age of sixteen, typically shows a heavy concentration toward the early puberty years, with a median age of fourteen.) n129 For example, in a 1983 study by Randy and Nancy Thornhill of 10,315 rape victims, eighty-five percent were less than thirty-six years old, n130 in sharp contrast to the female population at large. Women between the ages of sixteen and thirty-five were dramatically overrepresented. n131 As one scholar notes,\par\par

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n126. In nonhumans, see, for example, Emlen & Wrege, *supra* note 111, at 9 (examining nonrandom patterns of forced copulations, and finding that copulation attempts \22increase\5B \5D dramatically on the day that a female lays her first egg, but drop\5B \5D just as precipitously when she completes her clutch \22). \par\par

n127. See Thornhill & Thornhill, *Psychological Pain IV*, *supra* note 95, at 246. \par\par

n128. The 1991 National Crime Victimization Survey found that women between the ages of 16 and 19 were at greatest risk of rape, followed by women of 20 to 24 and 12 to 15. See Rob Hall, *Rape In America: A Reference Handbook* 90-91 (1995); see also Ellis, *supra* note 30, at 50 (citing studies); *Understanding Violence Against Women* 72 (Nancy A. Crowell & Ann W. Burgess eds., 1996) (reporting statistics from 1993 showing highest rates of rape and sexual assault among women 16 to 24 years of age); Patrick A. Langan & Caroline Wolf Harlow, *Child Rape Victims*, 1992, U.S. Dep't of Justice, Bureau of Justice Statistics: *Crime Data Brief* (1994) (35% of all victims between 12 and 18); National Victim Center, *Rape in America: A Report to the Nation* 3 (1992) (84% of female victims were under age 25; only 6% older than 29); Arthur Frederick Schiff, *Rape*, 6 *Med. Aspects Hum. Sexuality* 76, 82 (1972) (finding in one study, the ages of raped females ranged from 1 to 88, with the mode at 14; in another study, the range was 6 to 57, with a mode at 14 and an average at 23). \22Without exception, studies throughout the world have found that, while rape victims can be of any age, their ages are heavily concentrated between 13 and 35.\22 Ellis, *supra* note 30, at 50. In a 25-year study in India, the peak victim age was in the 13 to 17 year old age bracket, and only 4% of rape victims were older than 35 (despite an age range of 3 years old to 71 years old). See Vimala Veeraraghavan, *Rape and Victims of Rape: A Socio-Psychological Analysis* 21, 94-95 (1987). In a study of sexual assaults in London between 1978 and 1986, the majority of victims were in their 20s. See S.M. Keating et al., *Sexual Assault Patterns*, 30 *J. Forensic Sci. Soc'y* 71, 82 (1990). Fully 53% of the victims were between 18 and 30 years old. Less than 5% were over 50. See *id.* at 74; Carolyn J. Hirsch, *The Trouble with*

Rape 21-22 (1977) (\22The average age of adult rape victims \5Bi.e., excluding those under 16\5D was 24 years<Elip> most of the victims were between the ages of 16 and 34. Only 5% of the adult rape victims were between 45 and 74 years old; 23% of the rapes were of girls 15 or younger.); Thomas W. McCahill et al. , The Aftermath of Rape 7 (1979) (\22Using census figures for comparison, victims who report rape to the authorities are disproportionately likely to be 20 to 24 years old and much less likely to be 45 or more years old.\22). \par\par

This study of rape in Denver is typical. Of all the 5-year age groups, those at highest risk of rape were 15 to 19, followed by 20 to 24. Over 80% of victims were under 35 years of age, with the median victim age of 21. See DOJ Statistics, supra note 6, at 2 (1997) (\22Per capita rates of rape/sexual assault were found to be highest among residents age 16 to 19....\22). Data from three states using the new National Incident-Based Reporting System, for the year 1991, indicated that about 80% of rape victims were under age 30; while roughly half were under age 18, only 15% were under 12, with roughly 30% between 12 and 17. See id. at 11. \par\par

n129. See, e.g., Hursch, supra note 128, at 25 (reporting an age range of 70 child victims from 3 to 15 years of age, but with the frequency distribution dramatically skewed toward girls 14 and 15, with roughly 75% in the 12 to 15 range). The median age of raped children was roughly 14. See id. at 24. \par\par

n130. See Randy Thornhill & Nancy Wilmsen Thornhill, Human Rape: An Evolutionary Analysis, 4 Ethology & Sociobiology 137 (1983); see also Richard B. Felson & Marvin Krohn, Motives for Rape, 27 J. Res. Crime & Delinq. 222, 231 (Aug. 1990) (92% of rape victims, in this study, were under 41 years old). \par\par

n131. Of course, it is always possible to construct alternative hypotheses to explain data such as these. For example, it may be that rapists target females strictly according to \22vulnerability,\22 and that reproductive-aged females just happen, for sociocultural reasons unrelated to the biology of sexual desire to be out and about, unaccompanied, single, or dating more than other women. When a pattern of human behavior matches the patterns in other species, however, and when those patterns reflect context-specific behavior predictably favored by evolutionary processes, proponents of hypotheses that are thoroughly divorced from biology (and that are necessarily less parsimonious) bear the burden of persuasion. For more on this subject, see infra Section IV.A. \par

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By way of comparison, victims of other crimes, such as aggravated assault and murder, show a radically different age distribution<Elip> Indeed the age distribution of rape victims corresponds almost \5B*867\5D perfectly to the age distribution of women's reproductive value, in marked contrast to the age distribution of victims of other violent crimes. n132\par

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Prediction 7: The probability that a female sexual assault victim will be raped penile-vaginally (as opposed to orally, anally, or with digits or objects) will be higher for females within their reproductive years than it is for those outside their reproductive years.\par

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n132. Buss, supra note 101, at 164. \par

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Rationale: In the environment of evolutionary adaptation, penile-vaginal assaults of reproductive-aged females were more likely to result in conception than penile-vaginal assaults of unreproductive females. Evolutionary processes therefore would have tended to correlate the kind of sexual aggression with the age of the sexually assaulted victim. Specifically, it would tend to concentrate penile-vaginal assaults, compared to other kinds of sexual assaults, among those victims most likely to be reproductive. We therefore may expect the percentage of reproductive-aged victims who were raped penile-vaginally to be higher than the percentage of non-reproductive-aged victims who were raped penile-vaginally. Put another way, victims not of reproductive age are more likely to be sexually assaulted in ways other than penile-vaginal rape, compared to victims of reproductive age. \par\par

Data: This prediction has received some support. The Thornhills found that \ '22reproductive-age victims \ '5Bof sexual assault\ '5D were overwhelmingly more often victims of penile-vaginal intercourse than were victims in the other age categories.\ '22 n133 Moreover, the likelihood of penile-vaginal intercourse during sexual assault exceeded 90% when the victim was of potentially reproductive age (twelve to forty-four), while the likelihood of penile-vaginal intercourse during sexual assault was only 46% when the victim was nonreproductive-aged. n134 The disparity was \ '5B*868\ '5D greatest between reproductive-aged women who were raped and prereproductive-aged girls who were raped, the latter of whom were more likely not to have experienced penile-vaginal intercourse than to have experienced it. n135 The difference between reproductive and postreproductive-aged victims in this study, however, was not statistically significant. n13

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n133. Nancy Wilmsen Thornhill, supra note 101, at 96 (citing Thornhill & Thornhill, Psychological Pain IV, supra note 95). \par\par

n134. See Thornhill & Thornhill, supra note 65, at 103-04; Thornhill & Thornhill, Psychological Pain IV, supra note 95, at 247. \ '22Only 9% of reproductive-aged victims were victims of sexual assault other than penile-vaginal intercourse, including fellatio, cunnilingus, or rectal intercourse.\ '22 Id. at 249. Reproductive-aged victims were significantly more likely to be subjects of repeated intercourse than were nonreproductive-aged women and girls. See id. at 250. Reliable data on anal penetration during rape are rare. In one British study, anal intercourse was reported in 8% of rapes, but most of these were accompanied by vaginal rape as well. See Keating, supra note 128, at 80 tbl.7. \par\par

n135. The likelihood that prereproductive-aged girls in this study were not penile-vaginally raped was 66%. See Thornhill & Thornhill, Psychological Pain I V, supra note 95, at 247. \par\par

n136. See id. at 246 tbl.1, 247. The authors note that this may be due to the small number of postreproductive-aged women in the sample. While there were 585 reproductive-aged victims, there were only 36 postreproductive-aged victims. See id. \par

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Prediction 8: The trauma of rape victims in the immediate postrape period will tend to vary with age, being greatest among females of reproductive age and less, on average, among prepubescent and postmenopausal victims. \par\par

Rationale: The magnitude of the effect of being raped on female reproductive success is greater for fertile-aged females than for females incapable of conceiving and giving birth. Natural selection would therefore more strongly favor psychological resistance to rape in females of reproductive age. n137\par\par

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n137. According to Nancy Wilmsen Thornhill, \par\par
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the expectation that victim's age should be an important predictor of psychological trauma following rape stems from the hypothesized fitness consequences of rape for our female ancestors. The consequences were likely to have been most severe for women of reproductive age because these women have an increased probability that any sexual interaction will result in conception.\par

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Nancy Wilmsen Thornhill, supra note 101, at 94. For more on the evolution of psychological pain, see Michael McGuire & Alfonso Troisi, Darwinian Psychiatry (1998). \par
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Data: In a study examining a large and previously compiled data set of statistics on 790 rape victims in Philadelphia, \22reproductive-age victims were significantly more psychologically traumatized by rape than were pre-reproductive-age girls (0-11) or post-reproductive-age women (45+) <Elip>\22 n138 This study measured trauma by \5B*869\5D using self-reports about factors including difficulty sleeping, suffering nightmares, being afraid of unknown men, and having a fear of being home alone. n139 By contrast, when psychological trauma experienced by female victims of robbery is analyzed by victim's age, older victims are more traumatized than younger victims. n140\par
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n138. Nancy Wilmsen Thornhill, Psychological Adaptation to Sexual Coercion, supra note 101, at 94; Randy Thornhill, Rape-Victim Psychological Pain, supra note 95, at 239 (offering retrospective on Thornhill & Thornhill, Evolutionary Analysis of Psychological Pain I, supra note 95). The data set had 265 variables, 13 of which were considered relevant to the measurement of psychological pain: \par\par

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Fear of being out on the street alone, fear of being home alone, change in social activities, change in eating habits, change in sleeping habits, frequency of nightmares, change in heterosexual relationships (i.e. nonsexual relations with men), change in negative feelings toward known men, change in negative feelings toward unknown men, change in relations with husband or boyfriend, change in sexual relations with partner, insecurities concerning sexual attractiveness, and change in relations with family (other than husband).\par

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Thornhill & Thornhill, Psychological Pain I, supra note 95, at 161. For a comp

lete description of the data set, and its inherent limitations, see id. at 160-62. \par\par

n139. This finding is not confounded by either the kind of rapist (stranger or acquaintance) or the degree of violence used. Across the various combinations, victim age remains a statistically significant predictor of relative trauma.

See Thornhill & Thornhill, Psychological Pain III, supra note 95, at 304-19 (1990). Moreover, there is some evidence to suggest that younger women are more fearful of sexual assault than are older women. See Eric Pawson & Glenn Banks, Rape and Fear in a New Zealand City, 25 Area 55 (1993). \par\par

n140. See Nancy Wilmsen Thornhill, supra note 101, at 97. \par\par

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The difficulty in assessing the reliability of the underlying data on the psychological trauma of some of the prepubescent rape victims, particularly the youngest ones, is clearly worth mentioning. n141 Yet this finding was statistically significant, and other studies have apparently also suggested that prereproductive girls are less traumatized, on average, by sexual assault. n142\par

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n141. For instance, some of the 13 psychological variables (such as 'change in sexual relations with partner') did not apply to the youngest victims.

See Thornhill & Thornhill, Psychological Pain I, supra note 95, at 164. As the Thornhills also note, 'the child's caretaker sometimes helped the child respond to interview questions' Band with very young victims, the caretaker gave the responses to the questions based on his/her perception of the effect of the sexual assault on the child.' Id. at 161. \par\par

n142. See id. at 166 (citing David Finkelhor, Child Sexual Abuse: New Theory and Research (1984); A.P. Mannarino & J. Cohen, Psychological Symptoms of Sexually Abused Children (paper presentation) (1987)). \par

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Prediction 9: The trauma of reproductive-aged sexual assault victims in the immediate postrape period will tend to vary with the type of sexual assault, with vaginal rape being more traumatic, on average, than anal rape, oral rape, or forced cunnilingus - when these are not also accompanied by penile-vaginal rape.

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Rationale: Vaginal rape had greater reproductive consequences for ancestral females than other forms of sexual assault. Although natural selection would favor psychological aversion to physical compulsion generally, it also would favor more strongly psychological aversion to vaginal rape than to, for example, anal or oral rape. \par\par

Data: This seems to be the case. As early as 1979, several researchers noted that penile-vaginal intercourse is associated with adjustment problems in female rape victims more frequently than is any other variable relating to sexual acts, such as forced sexual contact without penetration, 'fellatio, cunnilingus, rectal intercourse, fondling and caressing, length of assault, or repeated intercourse. n143 More recently, evolutionists found that the greatest psychological trauma was seen in those reproductive-aged female rape victims who experienced penile-vaginal intercourse, compared with similar victims who experienced only other forms of sexual assault (including forced fellatio, anal intercourse, etc.). n144 Moreover, there is evidence to suggest that non-rep

reproductive-aged females are, in contrast, more equally traumatized by penile-vaginal intercourse and other forms of sexual assault. n145\par

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n143. See McCahill et al., supra note 128, at 67. \par\par

n144. See Thornhill & Thornhill, Psychological Pain IV, supra note 95; see also Nancy Thornhill, supra note 101, at 96; Randy Thornhill, Rape-Victim Psychological Pain, supra note 95, at 239. \par\par

n145. See Thornhill & Thornhill, Psychological Pain IV, supra note 95. It also appears that reproductive-aged rape victims are more likely to have sperm present in their reproductive tracts than are non-reproductive-aged victims, and that, among reproductive-aged victims, those with sperm in their reproductive tracts may be more traumatized than those without. See id. at 249-50. \par

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Prediction 10: A disproportionately high number of rapists will be young, sexually mature males. \par\par

Rationale: In their earliest years of sexual maturity, young men have, on average, less ability than older males to attract willing sex partners (due, in part, to comparatively lesser acquisition of resources and status). n146 If comparatively lesser access to willing sex partners increases the probability of sexual aggression, young males will likely be overrepresented among rapists.\par

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n146. See generally sources on sexual selection cited supra notes 74, 76, & 77; Buss, supra note 101; David M. Buss, Sex Differences in Human Mate Selection Criteria, An Evolutionary Perspective, in Psychology and Sociobiology 335 (Charles Crawford et al. eds., 1987); David M. Buss & David P. Schmitt, Sexual Strategies Theory: An Evolutionary Perspective on Human Mating, 100 Psychol. Rev. 204 (1993). \par

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Data: Rapists are disproportionately young, postpubescent males. n147 Studies often show a median age of twenty-five, n148 with only a small percentage of rapists over thirty. n149 Note that this has remained true, over time, even as different male cohorts age.\par

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n147. See, e.g., Buss, supra note 101, at 205; Hall, supra note 128, at 16-17, 38, 74; Veeraraghavan, supra note 128, at 57 (median age of rapists in 25-year study was 21 years old); Thornhill & Thornhill, supra note 130. Raping males in other great apes also tend to be young. See Nadler, supra note 13. \par\par

n148. See, e.g., John M. MacDonald, Rape Offenders and Their Victims 77 (1975). \par\par

n149. Although it is rarely explained in social science terms alone, the sharp contrast between the age distribution of men across the population, and the age distribution of rapists, has long been known. See, e.g., id.; Amir, supra n

ote 41, at 52-53 (the majority of offenders fall into the 15 to 24 age group; only 14% of all offenders are 30 years of age or older; median age for offenders is 23); id. at 57 ('22The literature on rape describing age distributions of offenders, reveals results similar to those found in the present study.'22); Brownmiller, supra note 35, at 174-76 (typical rapist is about 19 years of age; 61% of rapists are under the age of 25; largest concentration of offenders is in the 16 to 24 year age range); Lorenne M.G. Clark & Debra J. Lewis, Rape: The Price of Coercive Sexuality 96 (1977) (nearly 40% between the ages of 25 and 29); DOJ Statistics, supra note 6, at 4 (1997) (nearly 40% of rape offenders are between ages of 18 and 29, with an additional 11% under the age of 18); Gordon & Riger, supra note 2, at 34 ('22Of the men arrested for rape in 1986 <elip> forty-five percent were under twenty-five years of age and a third were between eighteen and twenty-four years of age. These patterns also are similar to those in previous years.'22); Joan Petersilia, Violent Crime and Violent Criminals: The Response of the Justice System, in Violence and the Law 226, 237 (Mark Costanzo & Stuart Oskamp, eds., 1994) ('22Rape offenders <elip> tend to be young, usually under 25.'22). While not all rapists are caught, there appears to be no study in which the age distribution of even suspected rapists is evenly distributed across the male population, or skewed toward either older men or prepubescent males. \par

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Prediction 11: The average age of women raped during robbery will be lower than the average age of all robbed women. \par\par

Rationale: If sexual desire is often a component in rapes, then the average age of female victims of rapes committed in conjunction with a robbery should be lower than the average age of female robbery victims, and skewed toward the reproductive years. \par\par

Data: This seems to be the case. In one study of 887 incidents of robbery, the age of female victims in robbery-rapes was compared with the age of victims in robberies where rape was not involved. n150 While the average age of female robbery victims was thirty-five years old, the average age of rape-robbery victims was significantly lower: less than twenty-eight years old. n151 The significance can be explained as follows: '22When a robber has the opportunity to rape, he is more likely to do so if the victim is young.'22 n152 This suggests that the overrepresentation of young women among rape victims is not likely to be simply a function of greater opportunity to rape young women. Controlling for opportunity, in the robbery context, reproductive-aged females are still overrepresented. \par

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n150. See Felson & Krohn, supra note 130. \par\par
n151. See id. at 232. \par\par
n152. Id. at 235. \par
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B. Discussion \par
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The evolutionary theories generate other predictions as well, and for these, too, researchers have generally found support. n153 But no simple '5B*872\5 D measure exists, of course, to quantify precisely the vitality of a behavior

al theory. n154 In the dynamic context of investigating complex evolutionary influences on behavior, for example, it is typically not essential that all predictions be simultaneously supported. Rather, the greater the number of predictions supported, the narrower the predictions themselves, and the more relevant species in which data are consistent, the greater the likelihood that a given bio behavioral theory has actual explanatory power. It is quite possible, for example, that the psychological trauma associated with rape victimization in females is rape-specific adaptation, at the same time that rape behavior in males is a by-product of psychological adaptation for less specific purposes.\par

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n153. These include, for example, predictions about variations in rape victim trauma according to mateship (e.g., marital) status. See, e.g., Thornhill & Palmer, *supra* note 14, at ch. 4; Thornhill & Thornhill, *Psychological Pain I*, *supra* note 95. For discussion of these and other predictions, see, for example, Ellis, *supra* note 30, at 53; Randy Thornhill, *Rape-Victim Psychological Pain*, *supra* note 95, at 239. \par\par

n154. See Jones, *Evolutionary Analysis in Law*, *supra* note 11, at 1208-11. \par

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From this brief survey, we know the following about the biobehavioral theories of rape causation rooted in natural and sexual selection. We know that natural selection will favor, over time, any heritable predisposition in animals that tends, on average, to increase an individual's reproductive success, compared to the reproductive success of its contemporaries. We know - because the potential costs and benefits of each copulatory act differ so dramatically - that sexual selection will favor different predispositions in males and females toward copulating with the opposite sex. We know that if evolutionary selection pressures have widely affected the patterns of forced copulation in those animals in which forced copulation appears, they will generate narrow and falsifiable predictions (by age, sex, and other variables) of specific circumstances that will be nonrandomly represented among incidents of forced copulation. We also know that in a great many species, including primates, males and females generally behave in ways consistent with these predictions. Moreover, there is evidence that at the primate *Homo sapiens sapiens* also exhibits a number of patterns apparently consistent with these predictions. \par\par

III Objections Considered: A Guide to Some Avoidable Errors\par

If biobehavioral theories are ever to be afforded relevance in the legal machinery that confronts rape, they must first survive scrutiny of both predictions and data with a skeptical eye. Ordinarily, one would proceed directly from the predictions and data to such evaluation. But in this case making that move too quickly, without pausing to consider objections to this entire line of reasoning, would be premature. For while the information just surveyed may be familiar to behavioral biologists and others comfortable with current evolutionary biology, it will likely sound implausible, perhaps even heretical, to others. After all, a thoughtful skeptic might argue: \par\par

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Any claim that rape is biological, rather than cultural, in origin - the function of \22rape genes\22 rather than environmental conditioning - must certain

ly be wrong. We already know that men rape to inspire fear, preserve male privilege, and resist female empowerment. Moreover, the claim that rape evolved because it is good for the species is patently absurd. Well-documented rapes of very young girls and very old women, neither of whom could possibly conceive, render the biological theories purely fanciful. In addition, there are societies in which rape is unknown. Many rapes are planned, not products of spontaneous passion. Many rapists are married, with presumably willing sex partners at home. And not only are many rapists sexually dysfunctional during the attack, but raping itself is unlikely to be adaptive. For even those rapes in which ejaculation occurs inside the victim's vagina are highly unlikely to result in pregnancy, particularly in an era of widespread contraception and access to abortion. And given the low likelihood of fathering a child, the possible penalties for raping make it simply too risky for procreative purposes. We should therefore resist evolutionary perspectives on sexual aggression. Accepting those perspectives will lead to rapists being excused for otherwise properly punishable transgressions.

This Part addresses each of these objections. I want to make clear, in the most emphatic terms, that the biobehavioral theories and studies are not beyond criticism. Nevertheless, these particular objections, common to many works dismissive of biobehavioral reasoning on which future legal thinkers may vulnerably rely, typically trace to often-understandable but nonetheless fundamental misunderstandings about what the biobehavioral theories do and do not say, and do and do not import, even if true. These objections are likely to cloud accurate assessment, probing critique, and constructive law-relevant interdisciplinary synthesis. I categorize these misunderstandings as:

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155. Some of these objections, as well as several objections not covered here, are raised and considered in Palmer, *supra* note 35; Randy Thornhill & Nancy Wilmsen Thornhill, *The Evolutionary Psychology of Men's Coercive Sexuality*, 15 *Behav. & Brain Sci.* 363 (1992) (hereinafter *Thornhill & Thornhill, Evolutionary Psychology of Men's Coercive Sexuality*); Randy Thornhill & Nancy Wilmsen Thornhill, *The Study of Men's Coercive Sexuality: What Course Should It Take?*, 15 *Behav. & Brain Sci.* 404 (1992). See also Kingsley R. Browne, *An Evolutionary Perspective on Sexual Harassment: Seeking Roots in Biology Rather Than Ideology*, 8 *J. Contemp. Legal Issues* 5, 47-65 (1997); Browne, *supra* note 76, at 1083-1101; Neil M. Malamuth, *Sexually Explicit Media, Gender Differences, and Evolutionary Theory*, 46 *J. Comm.* 8, 8-10 (1996) (discussing several regrettable misunderstandings about evolutionary theory that have caused some researchers to resist it).

156. Whether these sorts of misunderstandings result from widespread unfamiliarity with the basics of behavioral biology, the failure of biologists to make their theories adequately clear to lay-people, the sometimes overly reductionist language a biologist may at times employ, or something else is largely irrelevant for present purposes.

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- A. The Error of the False Dichotomy;
- B. The Error of the Damning Determinism;
- C. The Error of the Causal Correlate;
- D. The Error of the Manifest Motive;

- E. The Error of the Sponsoring Species; \par\par
- F. The Error of the Single Society; \par\par
- G. The Error of the Failed Fornicators; \par\par
- H. The Argument from Specious Spontaneity; \par\par
- I. The Argument from Substitute Sex; \par\par
- J. The Argument from Inconceivable Conception; \par\par
- K. The Argument from Modern Maladaptiveness; \par\par
- L. The Argument from Incomplete Explanation; and \par\par
- M. 'Ought-Is' Errors. \par\par
- A. The Error of the False Dichotomy\par

Most commentators who have addressed the biobehavioral theories of sexual aggression explicitly or implicitly frame them as inevitably competitive with the social-cultural-environmental theories, as if only one set can be right. 'Nature versus nurture,' 'biological versus cultural,' and the like are popular manifestations of this tendency. n157 As one critic innocently but wholly erroneously understood it, for example, 'Some biologists' term rape a 'biological phenomenon,' that is, an evolutionary or genetic phenomenon rather than a phenomenon derived from psychological, societal and cultural factors. n158 Another critic rejected 'the biologicization of rape' on the ground that it required 'the dismissal of social or 'moral' factors.' n159\par

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n157. See, e.g., Clark & Lewis, *supra* note 149, at 28 (considering biological and social explanations as mutually exclusive); Barbara Findlay, *The Cultural Context of Rape*, 60 *Women Law. J.* 199, 199 (1974) (same); Julia Siegel Schwendinger & Herman Schwendinger, *Homo Economicus as the Rapist in Sociobiology*, in Sunday & Tobach, *supra* note 45, at 85 (same). Even the most thoughtful legal commentators can inadvertently reinforce dichotomous thinking in readers. See, e.g., Robin West, *Caring for Justice* 118 (1997) (referring to 'necessity - whether biological or cultural'); Dripps, *supra* note 4, at 1781 (expressing disinterest in 'whether 'rape' originates from social or biological causes') (emphasis added). \par\par

n158. Ethel Tobach & Suzanne Sunday, *Epilogue to Sunday & Tobach* *supra* note 45, at 132 (emphasis added). This assertion appears without citation and is, of course, an extension of the popular (and equally misframed) debate, overviewed in Donovan, *supra* note 36, at 60, concerning the origins of sex differences in behavior: Are they 'biologically based, or culturally constructed?' \par\par

n159. John Dupre, *Blinded by 'Science': How Not to Think About Social Problems*, 15 *Behav. & Brain Sci.* 382, 382-83 (critiquing Thornhill & Thornhill, *The Evolutionary Psychology of Men's Coercive Sexuality*, *supra* note 155). \par

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It is simply erroneous to assume that either biology causes rape or sociocultural environment causes rape. n160 This fabricates a dilemma, and a '5B*875' 5D contest for disciplinary hegemony, where none need exist. To biologists, sociality, culture, and learning are all reflections of the human brain and its abilities, and they are consequently a reflection of our biology and evolutionary heritage. n161 Biology and environment are indivisible, for nothing lives, g

rows, or behaves, except within an environment. Biology and culture are therefore likewise indivisible, since culture can only be perceived, analyzed, transmitted, and effected through biological (and therefore principally evolved) neurological pathways.

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n160. As the Thornhills put it, The question of whether rape is a sexual act, a violent act, or an act of male domination of a woman is a central theme in a large literature that has grown out of the important place of rape in the feminist movement. The major error in this debate is that the motive behind rape is viewed as either sexual or violence and domination.

Thornhill & Thornhill, supra note 65, at 103; see also Thornhill & Palmer, supra note 14, at ch. 1 (noting that 'it is not even valid to talk about a trait as being 'primarily' genetic or environmental').

n161. 'Most evolutionary works on humans include an extended discussion of the inseparable and equally important influences of genes and environment in the development (ontogeny) and inheritance of all traits of individuals, including cultural or socially-learned behavior.' Thornhill & Palmer, supra note 14, at ch. 5 (emphasis added).

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False dichotomies, pitting biological explanation against another kind, typically reflect an often underrecognized confusion about the mechanisms of causation in living things. 'Causation' itself has different meanings in law and in biology. n162 And it is critical that legal scholars evaluating biobehavioral theories of rape keep these distinctions in mind. While lawyers parse distinctions between proximate causes, remote causes, concurrent causes, contributory causes, intervening causes, superseding causes, and 'but for' causes of phenomena, n163 behavioral biologists draw a single but crucial distinction between 'proximate' causes and 'ultimate' causes. n164 These are terms of art that have meanings in biology quite different from any that lawyers might impute to them. n165

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n162. Parts of this discussion rely on Jones, Evolutionary Analysis in Law, supra note 11, at 1127-28. See also Owen D. Jones, Genes, Behavior, and Law, 15 Pol. & Life Sci. 101 (1996) 'Hereinafter Jones, Genes, Behavior, and Law' D. n163. See, e.g., H.L.A. Hart & Tony Honore, Causation in the Law (2d ed. 1985). n164. On proximate and ultimate causation generally, see Alcock, supra note 47, at 2-6; Goldsmith, supra note 47, at 3-11, 46-69; Alcock & Sherman, supra note 82; Low, supra note 76, at 40-42. n165. See Jones, Genes, Behavior, and Law, supra note 162, at 101.

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In biology, the term 'proximate cause' refers only to the 'how' of behavior. It peacefully coexists with the term 'ultimate cause,' which describes the larger 'why' of behavior. More precisely, 'proximate causes' describe immediate causes, related to the internal mechanisms and development that cause an organism to manifest a particular behavior. They may be defined in terms of physiology and biochemistry, for example, as well as, at times, an organism's unique developmental-environmental history. n166 Most existing sociological and psychological studies of rape, for example, focus exclusively on the proximate, environmental causes. n167

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n166. See Goldsmith, supra note 47, at 6-11. \par\par

n167. See id. at 64-65. \par

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'5B*876\5D 'Ultimate causes,' on the other hand, describe evolutionary processes by which the same behavior came to be commonly observable. n168 They help to explain why given environmental stimuli tend to yield certain kinds of behaviors, rather than certain alternative behaviors, or indeed randomly responsive behaviors. Ultimate causes may be defined in terms of the history and reproductive consequences of behavior. Proximate and ultimate causes operate together, with all behavior depending on ultimately shaped proximate mechanisms. n169 Hence biologists studying sexual aggression understand the proximate causes in light of the evolutionary causes. They believe that proximate causes are simply acontextual without consideration of the way ultimate causation shapes the human brain, with the result that certain kinds of proximate causes are more likely to give rise to certain kinds of behaviors than to others.\par

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n168. See Alcock, supra note 47, at 2-6; Goldsmith, supra note 47, at 6-11.

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n169. Indeed, as Goldsmith puts it: 'Nothing of importance in biology can be said to have but a single cause.' Goldsmith, supra note 47, at 8. As Nancy Thornhill states, \par\par

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Proximate explanations for the existence of adaptations focus on genetic, biochemical, physiological, developmental, social, and all other immediate causes leading to the expression of adaptations. Ultimate explanations of adaptation have their theoretical foundation in causes that operated during evolutionary history to lead to adaptation<Elip> Proximate and evolutionary explanations of causation do not conflict. Both proximate and ultimate explanations are needed for complete understanding of adaptations. By understanding the evolutionary purpose of an adaptation, one should be able successfully to predict and understand the proximate causes that affect the expression of the adaptation.\par

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Nancy Wilmsen Thornhill, supra note 101, at 90. As Martin Daly and Margo Wilson write, \par\par

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Also impeding an infusion of evolutionary sophistication among social scientists

ts is the false dichotomy of 'social' versus 'biological' explanations. Subscribers to this dichotomy equate biology with its mechanistic subdisciplines such as genetics and endocrinology and think of biological influences as intrinsic and irremediable, to be contrasted with extrinsic and remediable social influences. Moreover, since putative biological influences are invariant and constraining, those who propose their existence (the so-called nature crowd) are unmasked as pessimists and reactionaries, while the advocates of 'alternative' social influences (the so-called nurture crowd) are optimists and progressives. This ideology, predicated on a profound incomprehension of evolutionary biology, pervades the social sciences, in which it is often accepted by nature advocates as thoroughly and thoughtlessly as by their nurture foes. A presumption of this prevalent worldview is that biology (falsely defined as the study of the invariant innate) is mute about aspects of sociality and behavior manifesting developmentally, experientially, and circumstantially contingent variations. The very demonstration of any such contingency is seen as an exercise in the alternative, antibiological mode of explanation. The irony is that developmentally, experientially, and circumstantially contingent variation is precisely what evolutionary biological theories of social phenomena are about.

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Daly & Wilson, *Evolutionary Psychology and Marital Conflict*, supra note 60, at 24. \par

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The importance of this distinction warrants a further clarification. Suppose one were to ask why a male robin sings. One answer would be, 'Because hormonal changes triggered by the lengthening of successive days cause the robin to force air over appropriately shaped vocal chords.' But this answer, using terms of proximate causation, leaves many questions unanswered. It does not explain, for instance, why it came to pass that lengthening days instead of shortening ones spark these hormonal changes instead of others, or why it came to be that these particular hormonal changes cause singing rather than, say, one-legged hopping. These latter questions concern the historical origins of currently manifested gene combinations, and thus require an inquiry into ultimate causation. The ultimate cause of singing behavior, evolutionary analysis reveals, reflects the fact that the remote ancestors of today's singing males, through their singing, claimed territory, attracted mates, and left more offspring than did contemporaries not predisposed to sing. To the extent the ability to sing and the urge to sing in response to certain environmental cues were influenced by heritable predispositions, the proportion of male robins in successive generations that sang inevitably increased over time until the trait became typical of males of the species. \par\par

In the same fashion, virtually all behavior - including many human behaviors - is most completely understood in terms of complementary proximate and ultimate causes. That is, when people exhibit law-relevant behaviors, there are often two very different kinds of causes operating simultaneously. If rape is significantly correlated with attitudes dismissive of female autonomy, for example, an evolutionary perspective suggests why such attitudes are likely to manifest, in part, in forced copulation, rather than in any of a whole host of other nonsexual activities (say, forced tattoos, forced sushi, or forced motorcycle-washing). \par

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n170. See Thornhill et al., supra note 118, at 103. \par

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Consequently, it is thoroughly consistent with biological theories of causation that variations in the environment, such as cultural attitudes, affect the incidence of rape. That point cannot be overemphasized, because of common assumptions to the contrary. Biologists do not dispute that many correlations to rape identified by social scientists indeed contribute to rape behavior. They do dispute, much more narrowly, that rape can be fully understood or explained absent supplementation with biologically informed perspectives. n171\par

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n171. Such a view is making increasing headway in the context of gender differences. Pratto, for example, argues, \par\par

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Culture is part of our nature. It is thus pointless to build theories that refuse to examine either nature or culture as having influence on the gender gap<Elip> Because we are still a sexually reproducing organism and exhibit a species-specific psychology <elip> biological factors cannot be relegated to ancient history. The view I take is that nature and culture cannot be meaningfully separated: they are mutually influential on each other and jointly influential on the nature of the gender gap<Elip> Evolutionary theories are not alternative explanations to \22situational\22 (e.g., cultural, social psychological, historical, structural) theories - in fact, they might be considered the grandparent of situational theories in that they predict that organisms will change their behavior and their features in different environments.\par

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See, Pratto, supra note 76, at 181-82, 200. \par

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B. The Error of the Damning Determinism\par

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Legal scholars writing on rape encounter social science claims that biobehavioral theories generally, and rape theories in particular, at least in \5B*878\5D the human context, are \22genetically deterministic.\22 n172 Some authors have understood the theories to suggest that male sexuality is \22uncontrollable,\22 n173 and assume that they inexorably lead people to think in terms of the old and properly discredited \22irresistible impulse\22 theories. n174 Rarely has so much been said about subjects that have not been raised. For in properly rejecting genetic determinism, social scientists would find few more zealous allies than evolutionary biologists and theorists of biobehavioral influences on rape patterns.\par

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n172. See, e.g., Allison & Wrightsman, supra note 5, at 36 (commenting on \22the biological deterministic theory\22); Ethel Tobach & Betty Rosoff, Preface to Sunday & Tobach, supra note 45, at v (describing the volume as \22the first in a series exposing the application of genetic determinism to justify racist and sexist theories and activities\22); Ethel Tobach & Suzanne R. Sunday, Pr

ologue to Sunday & Tobach, supra note 45, at xi (''Genetic determinism is the basic concept of sociobiology.''). Often, such assumptions come packaged in the language of ''programming.''' See, e.g., Timothy Beneke, Men on Rape (1982) (quoting Sanday as saying: ''It's important to understand that violence is socially and not biologically programmed''); Sarah Lenington, Sociobiological Theory and the Violent Abuse of Women, in Sunday & Tobach, supra note 45, at 13, 15-16 (claiming that evolutionary psychologists ''assume <elip> that these behaviors are ''genetically programmed'''). For a popular media account describing biobehavioral theories as about genetic programming, see Mary Batten, Why Men Rape, 90 Sci. Digest, July 1982, at 64. \par\par

n173. See, e.g., Sue Lees, Ruling Passions: Sexual Violence, Reputation and The Law 6 (1997) (characterizing the theories as ''the idea of male sexuality as natural and therefore uncontrollable''); Andrew Futterman & Sabrina Zirke, Men Are Not Born to Rape, 15 Behav. & Brain Sci. 385, 385 (critiquing Thornhill & Thornhill, The Evolutionary Psychology of Men's Coercive Sexuality, supra note 155) (''The Thornhills' article' is yet another attempt to attribute the cause of a complex human social behavior, in this case rape, to uncontrollable biological forces.''). \par\par

n174. On the origins of the irresistible impulse concept, see Scully & Marolla, supra note 33, at 294, 295-96. \par\par

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We can trace the confusion about genetic determinism to at least two sources. The first, like The Error of the False Dichotomy, is a failure to appreciate the complementarity of proximate and ultimate causation. Evolved predispositions operate probabilistically and are observable in species-typical, environment-sensitive patterns. Because probability is not inevitability, predispositions simply do not guarantee any behavior from any individual. And even high probabilities about patterns likely to emerge from some small subset of a population tell us little reliable about how a single individual is likely to behave. \par\par

The second source of confusion traces to the all-too-common failure to distinguish between two very different aspects of behavioral biology: (1) behavioral genetics; and (2) evolved or ''species-typical'' psychology. n175 Behavioral genetics involves efforts to trace the different behaviors of different individuals to different versions (alleles) of genes. For some behaviors this is an appropriate approach, occasionally law-relevant. By contrast, the evolutionary psychology aspect of behavioral biology, instead of investigating differences between individuals, investigates the sameness of individuals across a species in order to predict and discover which behavioral patterns are most likely to emerge and why. That is, it is an effort to trace the different behaviors of different individuals not to different genes, but rather to different environmental stimuli encountered by neurologically similar brains, sporting similar, evolved, contingent, and highly conditional decisional algorithms. n176 Evolutionary psychology predicts species-wide (in some cases sex-wide) physical, information-processing commonalities that have evolved to yield predispositions toward certain behaviors, in the face of certain categories and confluences of stimuli.\par

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n175. An example of this confusion appears in Susan B. Sorenson & Jacquelyn W. White, Adult Sexual Assault: Overview of Research, 48 J. Soc. Issues 3 (1992)

) (\'22If \'5Bbiological processes influenced rape\'5D, the many \'22normal' men who perpetrate dating violence would be expected to harbor <elip> defective genetic structures, imbalanced endocrine systems, or brain dysfunctions.\'22).

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n176. An excellent discussion of the differences between behavioral genetics and evolutionary psychology appears in Linda Mealey, *Kinship: The Tie That Binds (Disciplines)* (1999) (unpublished manuscript, on file with author).

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The tendency to assume that all biobehavioral theories trace sexual aggression to genetic differences between males tends, in turn, to increase apprehension of genetic determinism. This is unfortunate for two reasons. First, while it may be the case that some differences between rapists in propensity to rape can trace to genetic differences (such as a generalized heritable psychopathy), such differences are unlikely to account for any but a small percentage of rapes.

n177 Second, neither this explanation, nor the not incompatible one that traces the larger percentage of rapes to male-typical evolved psychology, is genetically deterministic.

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n177. Selection for heritable psychopathy would be frequency-dependent. Thus, heritable psychopathy would likely be adaptive and maintained in a population only so long as it remained rare (i.e., only so long as it appears at low frequencies, such as 1% to 3%). See, e.g., Linda Mealey, *The Sociobiology of Sociopathy: An Integrated Evolutionary Model*, 18 *Behav. & Brain Sci.* 523 (1995); see also Thornhill & Palmer, *supra* note 14, at ch. 3. Because heritable psychopathy would be polygenic, breeding would yield genetic variation even among psychopaths, which may in turn lead to heritable variances in rape propensities. Personal Communication with Randy Thornhill (Dec. 16, 1998).

n178. See Thornhill & Palmer, *supra* note 14, at ch. 3.

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But as feminist evolutionary biologist Barbara Smuts put it,

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\'5BSaying that\'5D male aggression against women reflects selection pressures operating during our species' evolutionary history...in no way implies that male domination of women is genetically determined, or that frequent male aggression toward women is an immutable feature of human nature<Elip> Far from being an immutable feature of human nature, male aggression toward women varies dramatically depending on circumstances.

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\'5B*880\'5D Genetic determinism, as it is popularly understood and feared, is a social construct, a mythical state of mind attributed to behavioral biologists (typically without citation) n180 and then cathartically demolished.

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n179. Barbara Smuts, *Male Aggression Against Women: An Evolutionary Perspective*, 3 *Hum. Nature* 1, 2, 24 (1992) (citations omitted); see also Pratto, *supra*

note 76, at 179, 220 (‘Thus, a biological view does not need to lead to deterministic predictions, but it suggests that the extreme version of cultural determinism - that absolutely any cultural arrangement is possible - may be wrong.’)

180. See, e.g., Jaggar, supra note 37, at 106-13. Many of the points Jaggar makes, in her intelligent rejection of determinism, are certainly shared by the large majority of credible behavioral biologists. Indeed, I am aware of no biologists today that would significantly disagree with her conclusions that biology and culture are inextricably intertwined as explanatory mechanisms for producing complex human behavior.

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C. The Error of the Causal Correlate

One of the most significant hindrances to integrating proximate and ultimate explanations of rape behavior, in pursuit of a more robust model on which to base legally facilitated deterrence, is that many scholars claim that the important questions have already been satisfactorily answered. They already know why men rape.

Perhaps. On close scrutiny, however, many supposed explanations for why men rape overdeduce cause and intent from effect, function, and correlation. These several aspects of rape, all important and related, are nonetheless logically distinct. Mixing them together unreflectively can therefore obscure the systematic discovery of causation in fact.

Brownmiller's often-imitated mistake serves as an example of reasoning that inadvertently conflates function and intent: ‘From prehistoric times to the present, I believe, rape has played a critical function. It is nothing more or less than a conscious process of intimidation by which all men keep all women in a state of fear.’ 181 It is a simple matter to quote such a passage without full context. And, in fairness, Brownmiller offers much detail in attempting to bolster this bold claim. But my narrow point here is that consumers of rape scholarship, such as legal thinkers, should not mistake claims about the meanings of rape to be facts about the causes of rape. 182 Meaning is a construct created by the analyst and offered in hope that its characterization of an act is somehow insightful. Causation is a scientific concept describing a particular relationship between a behavior and its antecedents.

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181. Brownmiller, supra note 35, at 15; see also Odem & Clay-Warner, Introduction to Confronting Rape and Sexual Assault, supra note 7, at xi (asserting that ‘rape is a means of inducing fear in women, limiting their movements, and reinforcing their dependence on men’ (emphasis added)); Wendy E. Stock, Feminist Explanations: Male Power, Hostility, and Sexual Coercion, in Sexual Coercion, supra note 7, at 61, 72 (arguing that sexual coercion by men serves the function of creating a state of sexual terrorism for women, with the intent and effect of maintaining social control of women). Brownmiller's message has not changed. See, e.g., Susan Brownmiller, Making Female Bodies the Battlefield, New York Times, Jan. 4, 1993, at 37 (describing rape as, in part, caused by the rapist's need ‘to give vent to his submerged rage against all women who belong to other men’). A resolution of the U.N. Security Council proclaims, ‘Rape is an abuse of power and control in which the rapist seeks to humiliate, shame, embarrass, degrade, and terrify the victim. The primary objective is to exercise

power and control over another person.¹⁸² The Situation of Human Rights in the Territory of the Former Yugoslavia: Note by the Secretary-General, U.N. General Assembly Security Council, 48th Sess., Agenda Item 115(c), U.N. Doc. A/48/92, S/25341 (1993) cited in Beverly Allen, Rape Warfare: The Hidden Genocide in Bosnia-Herzegovina and Croatia 119 (1996). In a chapter entitled "Why Do Men Rape Women?" two co-authors build conclusions about why men rape upon women's experiences. Andrea Medea & Kathleen Thompson, Against Rape (1974). There is of course a possible link between victim experiences and perpetrator intent, but not a properly presumptive one.

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Rape scholarship does not always make it easy to disentangle meaning and causation. Consider, for example, the following passage from a study of wartime rapes in the former Yugoslavia:

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A rape is an aggressive and humiliating act, as even a soldier knows, or at least suspects. He rapes because he wants to engage in violence. He rapes because he wants to demonstrate his power. He rapes because he is the victor. He rapes because the woman is the enemy's woman, and he wants to humiliate and annihilate the enemy. He rapes because the woman is herself the enemy whom he wishes to humiliate and annihilate. He rapes because he despises women. He rapes to prove his virility. He rapes because the acquisition of the female body means a piece of territory conquered. He rapes to take out on someone else the humiliation he has suffered in the war. He rapes to work off his fears. He rapes because it's really only some "fun" with the guys. He rapes because war, a man's business, has awakened his aggressiveness, and he directs it at those who play a subordinate role in the world of war.¹⁸²

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The passage has great moral force, but readers may take very different things from it. By explaining why rape is wrong, the words properly provoke outrage at rape, and they help readers to understand what rape means to women and soldiers, and possibly to other men. At the same time, the unqualified language of "It is," "because," and "to" seems to make statements of fact about why men rape. (The very etymology of "because" suggests a claim about causation.)¹⁸³ And it is all too easy to slide from social meaning to causation, without realizing the leagues one has crossed in doing so.

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¹⁸² Alexandra Stiglmayer, The Rapes in Bosnia-Herzegovina, in Mass Rape: The War Against Women in Bosnia Herzegovina 82, 84 (Alexandra Stiglmayer ed. & Marion Faber trans., 1994) (emphasis added); see also Rhonda Copelon, Surfacing Gender: Reconceptualizing Crimes Against Women in Time of War, in Mass Rape, *supra*, at 197, 198 ("Rape is sexualized violence that seeks to humiliate, terrorize, and destroy a woman based on her identity as a woman.").

¹⁸³ 1 The Oxford English Dictionary 746 (1961).

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Nevertheless, functional effect is not necessarily intended effect. Evidence proffered in support of these conclusions about motivation typically extrapolates from a small number of individual (and admittedly powerful) rape episodes w

ithout convincingly demonstrating, or often even attempting to demonstrate, that the parts are truly representative of the whole - that what was correlated with some rapes is correlated, generally, with most or all rapes. Committing The Error of the Causal Correlate would be. \5B*882\5D more easily dismissible as journalistic license were it not for the frequency with which it resurfaces in legal scholarship, n184 often in support of concrete legal implications. n185 If claims about causation underlie behavioral models, upon which legal strategies will be built, we should be more careful, early on, in examining those claims.\par

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n184. An example often invoked as evidence of why men rape, rather than why some men, or this man raped, concerns the infamous My Lai Massacre, after which a dead and presumably raped woman was left spread-eagled - with an 11th Brigade patch between her legs. (As Baker notes in her article, supra note 16, at 570 n.35, this incident is recounted in Brownmiller, supra note 35, at 103-05). Compare what this might imply with this passage, from Drew Westen, *Psychology: Mind, Brain, & Culture* 717 (1996): \par\par

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The most common and least violent of rapists are usually solitary, socially inadequate men with low self-esteem, whose primary aim is to reassure themselves of their sexual adequacy and masculinity by exercising power over their victim.

When interviewed months or years later, they typically report the fantasy that the women they rape will fall in love with them, and their behavior during the rape reflects this fantasy: They tend to kiss and fondle their victims, to compliment them on their beauty, to avoid violence, and to become distressed if the woman becomes too manifestly upset or struggles too much.\par

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Clearly, if one is going to make generalizable inferences about why men rape, the behavior of the many, rather than the few, is more significant. Of course, identifying the relative frequencies of different rape behaviors is likely to remain a difficult empirical issue. \par\par

n185. See, for example, the Violence Against Women Act of 1994, Pub. L. No. 103-322, 40111(a)-40611, 108 Stat. 1796, 1903-53 (codified as amended in scattered sections of 8, 18, 28, and 42 U.S.C.), which is discussed infra text accompanying notes 323-340. \par

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Moreover, correlation is not causation. Consider, for example, the correlation in many contexts between aggression and sex. As a logical matter, sex could be a vehicle for aggression, as commonly assumed and asserted, or aggression could be a vehicle for sex. Only scientific method and rigorous hypothesis-testing can establish which causes what. Similarly, it could be that rape is an epiphenomenon of sociocultural messages that devalue women. But it could also be the case that devaluing women is simply a precondition for rape. That is, respect may be an inhibiting factor that suppresses otherwise more persistent sexuality, and where society insufficiently fosters respect, rape is a result. That does not automatically mean that rape is primarily a vehicle for expressing lack of respect, any more than eating is primarily a vehicle for expressing chewing. Legal thinkers should be skeptical of all conclusions that reason, without substantially more, from correlate to cause. \par\par

D. The Error of the Manifest Motive\par

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Just as it is easy to confuse correlation with causation, it is easy to overentwine causation with motivation. This can lead to the assumption that identifying motives for rape will alone provide sufficient insight into the causes of rape. n186 For example, that assumption may lead one to conclude that if a rapist is not consciously motivated by a desire to father a child through the victim then theories of biobehavioral influences on rape that build on the potential reproductive significance of rape must be wrong. It is then a short step to the seemingly related conclusion that if a rapist himself manifests a motive for rape other than sexual desire (such as a desire to humiliate) then sexual desire is also unrelated to rape. n187\par

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n186. This can also lead to debates, some more useful than others, over what is the 'primary' or 'dominant' motive for rape. See, e.g., Groth, supra note 33, at 2 ('Forcible sexual assault is motivated more by retaliatory and compensatory motives than by sexual ones.')(22); Murray L. Cohen et al., The Psychology of Rapists, 3 Seminars in Psychiatry 307, 311 (1971) (discussing 'primary' aims and 'dominating' motives); Janssen, supra note 44, at 12 ('The primary motive is to control the victim <Elip>'); Ken Plummer, The Social Uses of Sexuality: Symbolic Interaction, Power and Rape, in Perspectives on Rape and Sexual Assault 37, 42 (June Hopkins ed., 1984) ('In single rape, in group rape and in wartime rape, it seems that sex per se is rarely (probably never) the dominant factor; rather domination, anger and male camaraderie seem to be the central concerns.')(22); Richard T. Rada, Psychological Factors in Rapist Behavior, in Alan Soble, The Philosophy of Sex: Contemporary Readings 21, 24 (2d ed. 1991) ('The primary motive in the rapist is the desire to control the victim in the specific instance of rape and, by extension, all women.')(22); Tamara L. Tompkins, Prosecuting Rape as a War Crime: Speaking the Unsayable, 70 Notre Dame L. Rev. 845, 855 (1994/95) ('The primary goal of the typical rapist is not achieving sexual satisfaction, but rather fulfilling a need to exercise control over a woman and thereby dominate her.')(22). Some authors have developed systems to classify rapists, according to the proportions of sexual and aggressive motives for the act. See, e.g., Groth, supra note 33; see also Mary Koss & Kenneth E. Leonard, Sexually Aggressive Men: Empirical Findings and Theoretical Implications, in Neil M. Malamuth & Edward Donnerstein, Pornography and Sexual Aggression 213, 232 (1984) (citing, as examples, Cohen et al., supra; A. Nicholas Groth et al., Rape: Power, Anger, and Sexuality, 134 Am. J. Psychiatry 1239 (1977)). For an overview, see Raymond A. Knight et al., Classification of Sexual Offenders: Perspectives, Methods, and Validation, in Rape and Sexual Assault, supra note 30, at 222. \par\par

n187. See Florence L. Denmark & Susan B. Friedman, Social Psychological Aspects of Rape, in Sunday & Tobach, supra note 45, at 59, 61. \par

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The problem with this reasoning is that it overestimates the importance of conscious motivation in biobehavioral theories and reflects a deep misunderstanding of the process by which evolution affects behavior. n188 Natural selection affects behavior by having favored, over time, those brains that increased the probability of certain kinds of behaviors in response to certain kinds of environmental stimuli, whenever those behaviors, on average, increased reproductive

success (however indirectly). For example, those organisms whose brains gradually increased the urgency of food acquisition in response to neural stimuli signaling an empty stomach tended to leave more descendants than those organisms whose brains did not, or whose brains, in response, increased the probability of other kinds of behavior unlikely to provide nutrition gains. Brains have a variety of mechanisms by which to increase the likelihood of certain behaviors; inspiring a conscious motive to achieve the adaptive result is merely one of them, often unnecessary. n189 The urge to eat can exist quite independently of any conscious motive to acquire nutrition, and the urge to have sex can exist quite independently of any conscious motive to reproduce. The absence of the conscious motive to achieve a biologically useful result does not make either eating or sex incapable of being understood in biological terms. And the closer the nexus between the behavior at issue and behavior that was adaptive during the environment of evolutionary adaptation, the more powerfully human evolved psychology likely affects the patterns of that behavior, regardless of subjective awareness that it does so.

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n188. See, e.g., Neil M. Malamuth, *The Confluence Model of Sexual Aggression: Feminist and Evolutionary Perspectives*, in Buss & Malamuth, *supra* note 30, at 269, 272 (explaining how sound evolutionary theories of behavior simply do not require conscious motivation).

n189. Indeed, evolutionists have frequently gone to great lengths to clarify that conscious motivation toward adaptive ends is unnecessary for adaptation.

Daly and Wilson, for example, write:

Evolutionists are misunderstood to claim that fitness itself is what people and other animals strive for. In actuality, fitness consequences are properly invoked not as direct objectives or motivators, but as explanations of why certain proximal objectives and motivators have evolved to play their particular roles in the causal control of behavior. Selection designs organisms to cope with particular adaptive problems that have been sufficiently persistent across generations, both in their essential forms and in their significance, to have favored particular solutions. These evolved solutions necessarily entail contingent responsiveness to environmental features that were statistical predictors of the average fitness consequences of alternative courses of action in the past. Adaptation is not prospective; adaptive performance in contemporary environments depends on the persistence of essential features of past environments.

Daly & Wilson, *supra* note 60, at 23-24.

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Proximate and ultimate causation operate simultaneously, and a variety of proximate desires can also operate simultaneously. Consequently, the hypothesis that rape is motivated by hostility or a desire to humiliate is not necessarily incompatible with the hypothesis that evolutionary influences on sexual behavior contribute to rape patterns. Not all causes are manifested in motives.

E. The Error of the Sponsoring Species

Legal thinkers are apt to encounter commentators who frequently (if unintentionally)

nally) caricature the view that evolutionary processes affect the incidence of rape by saying that 'this 'biological' view argues that rape is a male instinctive reaction that is a drive to perpetuate the species.'¹⁹⁰ The view is so characterized - that rape exists because it is good for the species - must be incorrect, one could quickly conclude, for two reasons. First, all experience makes clear that humans are not mindless automata, governed by instinct. Second, if behavior did evolve to perpetuate the species (as the author quoted above thinks biologists think), then women should have the same drive as men and would willingly copulate whenever reproduction was possible. Since they do not...Q.E.D. Authors who advance such arguments adduce evidence 'inconsistent with the proposition that rape is the 'result of a need to perpetuate the species,' assuming that they are then done with the matter. ¹⁹¹

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¹⁹⁰ Harvey Wallace, *Family Violence, Legal, Medical, and Social Perspectives* 256 (1996) (offering this characterization in his discussion of 'Women and Sexual Violence'). The error is not limited to critics, however, as even the sympathetic or agnostic often innocently misunderstand the biological theories, as well. See, e.g., W.L. Marshall & H.E. Barbaree, *A Behavioral View of Rape*, 7 *Int'l J. L. & Psychol.* 51 (1984) ('There is some evidence to suggest that the potential to engage in forced heterosexual acts (rape), may serve to enhance species-survival...'). \par\par

¹⁹¹ Allison and Wrightsman make this error, after noting that sometimes rape victims are men. See Allison & Wrightsman, *supra* note 5, at 36-37. \par

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This often-encountered summary of the evolutionary perspective suffers from two distinct fatal flaws. First, characterizing psychological predispositions as 'instinctive reaction' implies a mindless reflexiveness and inevitability in human behavior that biologists simply do not believe exists in the context of such complex behavior as sexual aggression. Second, and more significantly, it is inconsistent with the most fundamental principles of evolutionary biology to say that a trait evolves 'to perpetuate the species.'¹⁹² Modern biologists do not make this claim. \par

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¹⁹² See, e.g., *id.* at 17 (misascribing to biologists the contention that 'social behavior evolves because it is adaptive to propagating the species' 2); Blackman, *supra* note 45, at 118 (claiming that those 'who advance biological explanations for social characteristics 'Bargue that these' are adaptive for the species'). \par

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The key mistake here is as destructive to discourse as it is easy to make. Mainstream biology abandoned this particular brand of 'group-selection' thinking some time ago (in 1966) in favor of the more theoretically and empirically robust model of selection operating at the level of the smallest heritable traits (generally genes).¹⁹³ What this means (as foreshadowed earlier) is that heritable behavioral predispositions persist and spread for any significant le

length of time only if they increase, on average, the reproductive success of the individuals bearing them. n194 Observable traits are therefore the product of de facto competition between individuals of a species, rather than the product of individual contributions to the success of the species that may come at significant costs to the individual. Nothing in contemporary behavioral biology suggests that rape (or any other trait) evolved to perpetuate the species, because when species persist it is only as an epiphenomenon of the aggregated success of individuals' traits that are effective at replicating themselves. Whether rape is good for the species is irrelevant to critical assessment of the life science theories of rape.\par

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n193. See supra notes 69-71 and accompanying text. \par\par

n194. See supra note 53. \par

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F. The Error of the Single Society\par

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Some early rape scholars reasoned that biobehavioral theories about evolutionary influences on patterns of sexual aggression are disproved by the existence of even a single human society in which rape does not exist. n195 This line of reasoning continues to surface in modern rape literature. n196 Such a claim makes sense if two things are true: (1) biological theory predicts complete universality across the human species; and (2) a society without rape exists. Both conditions are necessary, but neither is true.\par

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n195. See, e.g., Griffin, supra note 35, at 27 (purporting to refute theories of biological influence with the claim: 'But in truth rape is not universal to the human species.'). Nothing in biobehavioral theories of behavior suggests that the incidence of rape will be constant across all human societies.

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n196. For example, Sanday writes, \par\par

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Cross-culturally the incidence of rape varies considerably. To explain such variation in the incidence of rape we cannot fall back on ethnocentric assumptions about the 'animal' or rape-prone nature of men. Innate tendencies do not explain the incidence of rape. Whatever the biological basis for sexuality may be (and I do not deny a biological component), the variation in the incidence of rape cross-culturally demonstrates that culture is a powerful force in channeling the human sex drive.\par

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Peggy Reeves Sanday, Rape and the Silencing of the Feminine, in Tomaselli & Porter, supra note 30, at 84, 84-85. Sanday then goes on in the balance of her chapter to suggest that variation between cultures that can be correlated to sociocultural contexts and ideology of male dominance renders biological arguments incorrect. See also Ruth Seifert, War and Rape: A Preliminary Analysis, in Mass Rape, supra note 182, at 56 ('Ethnological research offers a further argument against considering rape in any biologicistic or 'naturalizing' way, for some societies have a high incidence of rape and others a low one.'). \par

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First, biobehavioral theories are probabilistic. Because they are not about 'always,' they cannot be disproved by a 'sometimes.' This is not evasiveness, but rather a necessary by-product of the fact that behavior is plastic and can be influenced by predispositions (not predeterminations) that are environmentally sensitive. n197 While the absence of rape from societies encompassing a large percentage of the human population would make more difficult the case for evolutionary influences specific to sexual aggression, the existence of evolutionary influences would not be significantly undermined by the absence of universality alone. Second, and despite continued popular belief that Margaret Mead and Peggy Reeves Sanday discovered societies where rape was unknown, n198 it has been demonstrated convincingly that this is untrue. n199\par

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n197. See supra Section I.B. \par\par

n198. For the continued influence of Sanday's study, see, for example, its republication, to favorable comments, in *Confronting Rape and Sexual Assault*, supra note 7, at 93. \par\par

n199. See, e.g., Derek Freeman, *Margaret Mead and Samoa: The Making and Unmaking of an Anthropological Myth* 849 (1983) (estimating that the rape rate in Samoa is actually higher than that in the U.S.); see also Ellis, supra note 30, at 6 ('In West Sumatra, one of the reputed 'rape-free' societies <elip> Sanday <elip> found the actual rape rate was about 19 per 1 million females, low by most Western standards, but not entirely 'rape-free.''); Craig Palmer, *Is Rape a Cultural Universal? A Re-Examination of the Ethnographic Data*, 28 *Ethnology* 1 (1989). Samoa, which Margaret Mead reported in the 1930s to be essentially rape free, has since been shown to have an official rape rate twice as high as that for the United States. See Wrangham & Peterson, supra note 93, at 282-83; Palmer, supra, at 6; Patricia D. Rozee, *Forbidden or Forgiven? Rape in Cross-Cultural Perspective*, 17 *Psychol. Women Q.* 499, 512 (1993) (concluding, after cross-society random sample of 35 societies, that 'the notion of a rape-free culture was not supported by this study'). \par

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G. The Error of the Failed Fornicators\par

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Some authors claim that the theory that sexual desire influences patterns of rape 'has been discredited...because' high levels of sexual dysfunction have been reported. n200 The argument is that the high number ' of failed fornicators suggests that sex is not a significant motive in rape. By some reports, thirty-four percent of assailants fail to ejaculate in the victim. n201 Certainly, there is some percentage of dysfunction high enough to present a significant challenge to the evolutionary theories. But this is not it. Theories of evolutionary influence do not require that every assailant successfully ejaculate. That the majority of rapists apparently do ejaculate is amply sufficient. It is necessary only that in the environment of evolutionary adaptation the reproductive success benefits of accumulated rape attempts exceeded the costs of those attempts (on average, across all individuals bearing psychological, context-specific predispositions affecting the likelihood of rape). Dysfunction during individual assaults, even consistent dysfunction of some rapi

sts during sequential assaults, in no way falsifies the theories.\par

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n200. Adrian Furnham & Natalie Boston, *Theories of Rape and the Just World*, 2 Psychol., Crime & L. 211, 214 (1996) (citing A. Nicholas Groth & Ann Wolbert Burgess, *Rape: A Sexual Deviation*, 47 Am. J. Orthopsychiatry 400 (1977)); see also Allison & Wrightsman, *supra* note 5, at 36 (suggesting theory undercut by evidence that '22some '5Brapists'5D were unable to achieve erections, or do not ejaculate during the rape'22); Tedeschi & Felson, *supra* note 116, at 313 (noting that the fact that some rapists experience sexual dysfunction has been cited as evidence against sexual motivation). \par\par

n201. See Hall, *supra* note 128, at 76. \par

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H. The Argument from Specious Spontaneity\par

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Legal thinkers should be aware that many scholars misattribute to the biological theories of sexual aggression the necessity of spontaneity in rapes. n202 A premeditated rape is thought to be conclusive proof that the biology of sexual desire is irrelevant. The logic, apparently, is that any planned sex would be non-sex, since sexual desire is impulsive. n203 As others have pointed out, however, we have no trouble accepting that many consensual liaisons are sexual in function and purpose, even when one or both of the participants planned the preliminaries. n204 In dating, for example, one party's planning for sex does not make subsequent consensual sex nonsexual. The biological theories of evolutionary contributions to rape causation require only that males, as a function of evolutionary processes, be highly motivated to pursue or create opportunities for copulation - not that they do so on sudden impulse.\par

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n202. See, for example, Brownmiller, *supra* note 35, at 183, who in commenting on Amir, *supra* note 41, notes, '22Far from being a spontaneous explosion by an individual with pent-up emotions and uncontrollable lusts, '5BAmir'5D discovered the act was usually planned in advance and elaborately arranged by a single rapist or a group of buddies.'22 \par\par

n203. Richard T. Rada writes, \par\par

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Rape is a crime of control, power, and dominance. The primary motive in the rapist is the desire to control the victim in the specific instance of rape and, by extension, all women. In this sense, the aggressive component appears to be more dominant in rape than the sexual component. In fact, for many rapists the sexual act itself appears to be less important than the ritual of the rape even t, which is more often carefully planned than impulsive.\par

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Rada, *supra* note 32, at 24. \par\par

n204. For further discussion of this point, see Palmer, *supra* note 35, at 51

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I. The Argument from Substitute Sex\par

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Legal thinkers should also avoid the commonly observed presumption that biological theories of sexual aggression are disproved by evidence that many rapists have consensual sex partners available. n205 Some commentators that rape scholars may encounter have gone so far as to claim that the ready availability of masturbation, as a substitute for sex, exposes a weakness in the biobehavioral theories. n206\par

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n205. See, e.g., Amir, *supra* note 41, at 321 ('If it is sexual hunger,' we already alluded that lower-class boys are not deprived of sexual outlet.' 22); Gordon & Riger, *supra* note 2, at 45 (asserting that sex drive is not an important constituent of rape causation, since 'research on rapists in prison indicates that about a third are married and were sexually active with their wives at the time of the assault' 5Band\5D of those not married, the majority were involved in consenting relationships' 22); Langevin, *supra* note 32, at 393 ('About 6-in-10 rapists are married at the time of the offence and some writers assume that sexual deprivation is not a factor in the commission of the act.' 22); Richard T. Rada, *Psychological Factors in Rapist Behavior*, in *Clinical Aspects of the Rapist*, *supra* note 32, at 21-22 (arguing that rape cannot be only sexual, since rapists have other sexual outlets); Stock, *supra* note 181, at 62 ('Sexual coercion is motivated by power, not lust' 22 because in a clinical study of 500 identified offenders, 'one-third of the offenders were married and sexually active with their wives at the time of their assaults; the majority of the nonmarried sample were actively involved in a variety of consensual sexual relations with others at the time of their offenses.' 22). But see Palmer, *supra* note 35, at 516 (critiquing this line of reasoning). \par\par

n206. For example, Stock writes, 'When this feminist approach' 5D is applied to rape <elip> it becomes evident that rape is not only the result of uncontrolled lust <elip> ' 5Bbecause that does' 5D not sufficiently explain why rape occurs when alternative sexual outlets are always available, including masturbation <Elip>' 22 Stock, *supra* note 181, at 62. \par

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It is a mistake to understand those theories to be about sexual release - as if any release will do - rather than sexual desire. n207 At the same time that natural selection might have favored a general predisposition toward increasingly aggressive sexuality, in the face of unsuccessful mating efforts, natural selection certainly favored a general predisposition to increase the number of sex partners, not just the number of sex acts per partner. (Recall that male reproductive success, in contrast to female reproductive success, tends to increase as the number of sex partners increases.) Biobehavioral theory suggests that males without consensual mating opportunities might be most likely to rape, but it does not suggest that available sex with one female will necessarily preclude rape of other females. In the white-fronted bee-eater bird, for example, raping males (who narrowly target females during the fertile part of their individual cycle) often have contemporaneously willing and reproductive mates. n208 This is consistent with the hypothesis that 'forced copulation is an additional mating tactic rather than a substitute.' 22 n209\par

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n207. As one evolutionist noted, "most patrons of prostitutes, adult book stores, and adult movie theatres are married men, but this is not considered evidence for lack of sexual motivation." Palmer, *supra* note 35, at 516 (quoting Donald Symons, *The Evolution of Human Sexuality* 280 (1979)). \par\par

n208. See Emlen & Wrege, *supra* note 111, at 10-11. \par\par

n209. R. Robin Baker & Mark A. Bellis, *Human Sperm Competition: Copulation, Masturbation, and Infidelity* 37 (1995) (citing Ellis, *supra* note 30). \par\par

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J. The Argument from Inconceivable Conception\par

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It is not uncommon to encounter, during research on rape causation, the claim that the low likelihood of pregnancy from individual rapes disproves evolutionary arguments. n210 The following statement is typical of such criticisms: "The biological theories are improbable because rapes rarely lead to the birth of a viable child." n211 Such a view is intuitively appealing. And rapes rarely do lead to conception and birth. But the conclusion that rare benefits are insufficient to have widespread evolutionary significance is, though understandable, biologically naive.\par

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n210. See, e.g., Baron, *supra* note 85, at 271; see also Thornhill & Palmer, *supra* note 14, at ch. 5 (collecting and critiquing additional sources using this line of reasoning). \par\par

n211. Eckart Voland, *Selection for Rape or Selection for Sexual Opportunism?*, 15 *Behav. & Brain Sci.* 402, 402 (critiquing Thornhill & Thornhill, *Evolutionary Psychology of Men's Coercive Sexuality*, *supra* note 155); see also Travis Langley, *Empirical Criteria for Evaluating Rape as an Evolutionary Phenomenon*, 15 *Behav. & Brain Sci.* 393, 393 (same; also noting that "costs could well outweigh benefits because rape is highly unlikely to produce offspring"). \par

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Over evolutionary time, even small increases in reproductive success can have powerful effects. n212 As mentioned earlier, a trait offering a meager 1% reproductive advantage over an alternative trait can swell from 1% representation in a population to 99% representation in 265 generations. n213 The truth of this point, demonstrable in computer simulations as well as in laboratory demonstrations with simple organisms, is essential to the evolution of complex morphology and behavior. Pregnancy rates from rape are estimated at roughly 1% to 5% across all victims, and roughly 5% for females of reproductive age. n214 For comparative purposes, the chances of pregnancy resulting from an individual act of intercourse with a willing partner in her twenties is typically estimated at only 2% to 4%. n215 These figures not only fail to falsify the biobehavioral theories, but are amply consistent with them. In the United States, among adult females alone, there are more than 32,000 rape-related pregnancies each year. n216 Given the probability that a number of raped women were using contraception at the time, the percentage of rapes that resulted in conception and birth was 1

likely higher in nontechnological ancestral environments, providing ample differences in reproductive success for natural selection to operate. n217\par

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n212. For a book devoted entirely to making this point clear, see Dawkins, *Climbing Mount Improbable*, supra note 49. \par\par

n213. See supra note 61 and accompanying text; see also Trivers, supra note 61, at 28-29. \par\par

n214. See, e.g., Ellis, supra note 30, at 47 (1% to 3%) (citing studies); *Understanding Violence Against Women*, supra note 128, at 76 (5%) (citing studies); Melisa M. Holmes et al., *Rape-Related Pregnancy: Estimates and Descriptive Characteristics from a National Sample of Women*, 175 *Am. J. Obstetrics & Gynecology* 320, 320 (1996) (less than 1% to 5%) (citing studies); id. at 322 tbl.2 (pregnancy rates for rape victims in their reproductive years found to be 5%). \par\par

n215. See Ellis, supra note 30, at 47. \par\par

n216. See Holmes et al., supra note 214, at 322. Roughly 40% of the rape-related pregnancies resulted from multiple assaults rather than from a single attack. See id. at 323. \par\par

n217. As one set of authors put it, '22In considering this evolutionary view of rape, it is important to keep in mind that very small consistent differences in fitness among individuals may have large long-term effects. A small difference in fitness between men who raped when other avenues of reproduction were closed compared to men who did not rape in this context during human evolutionary history would be expected to lead to major evolutionary change.'22 Thornhill et al., supra note 118, at 115. \par

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\5B*890\5D Moreover, commentators commonly mistake the statistically relevant reference group. The key question is not whether rapes result in a large number of pregnancies, but whether rapes result in a larger number of pregnancies than do alternative forms of sex behavior available to the rapist. Brownmiller and Mehrhof argued, as recently as 1992, that evolutionary theories of rape were '22fanciful'22 because '22in terms of successful reproductive strategy, the hit or miss ejaculations of a single-strike rapist are a form of Russian roulette compared to ongoing consensual mating.'22 n218 But this misses the point entirely. Ongoing consensual mating is not an option for every male, at all times. Compared to unwanted abstinence, even conditional predispositions that provide rare reproductive benefits would provide an evolutionary advantage. n219 Even a male with a willing sex partner who also raped other females could increase total pregnancies compared to males who copulated only with one partner at a time. Consequently, it is at least plausible that natural selection would have favored a context-contingent predisposition to use increased force in furtherance of copulation when the alternative was likely to yield smaller increases in reproductive success. n220 A hypothetically contemporaneous predisposition simply to accept one's current reproductive lot, successful or not, would appear in a decreasing proportion of individuals in subsequent generations.\par

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n218. Susan Brownmiller & Barbara Mehrhof, *A Feminist Response to Rape as an Adaptation in Men*, 15 *Behav. & Brain Sci.* 381, 381-82 (1992) (critiquing Thorn

hill & Thornhill, Evolutionary Psychology of Men's Coercive Sexuality, supra note 155).

In a totally different context, Stephen Pinker extends the metaphor in a way useful here.

Imagine a game of Russian roulette where if you don't get killed you have one more offspring. A gene for joining in the game could be selected, because five-sixths of the time it would leave an extra copy in the gene pool and one-sixth of the time it would leave none. On average, that yields .83 more copies than staying out of the game.

Pinker, supra note 48, at 514.

See Thornhill et al., supra note 118, at 115 ('Thus the adaptiveness of rape must be viewed in relation to the adaptiveness of other, alternative strategies'); see also supra text accompanying notes 117-124 (discussing existence of evolved, context-specific strategies).

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- K. The Argument from Modern Maladaptiveness

Another common error is the assumption that if today's rapists gain no reproductive advantage over nonrapists, or are in fact decreasing their inclusive fitness, then the biobehavioral theories of rape are wrong. For example, one critic argued that, for the theories to have even the slightest claim of validity, behavioral biologists would have to establish that a modern rapist's reproductive success actually increases as a result of his raping behavior.

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- See, e.g., Adrian Raine, The Psychopathology of Crime: Criminal Behavior as a Clinical Disorder 42-46 (1993).

See Suzanne Sunday, Introduction to Sunday & Tobach, supra note 45, at 4.

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- The reasoning is tempting, but incorrect. Evolutionary arguments are grounded in evolutionary time. Because natural selection cannot look forward and anticipate future environmental changes, individuals of existing species are typically best adapted to their ancestors' environments. The faster an environment changes (if at all) and the lengthier a species' average generation, the more quickly historically adaptive morphology and behavior can fall out of step with one another, and a once adaptive trait can soon become maladaptive.

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- Randy Thornhill and his colleagues summarize the importance of ancestral history to sound evolutionary analysis in this way:

An adaptation is a feature of a living organism that is the product of the direction

ect action of selection. These features, however, may or may not be presently a daptive. That is, the definition of adaptive must include a consideration of th e relevant environmental conditions. If the relevant environmental features cha nge, then it is possible that previously adaptive traits may be rendered malada ptive.\par

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Thornhill et al., supra note 118, at 104. \par
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Take, for instance, our taste for highly caloric sweets. All across the spec ies, we perceive chemical stimuli associated with certain high energy foods to be \22sweet\22 and pleasurable (rather than, for instance, bitter and unpalat able). This species-typical sensory artifact is undoubtedly a product of our ev olutionary history. Ancestral primates even marginally more likely than their c ontemporaries to seek and consume high energy foods (such as ripe fruit) would leave more descendants than those who were less motivated, perhaps finding high calorie foods distasteful, and who therefore procured fewer calories per unit of energy invested in foraging. Today, our evolved tastebuds and psychology enc ounter an evolutionarily novel environment, with refined sugar. It is now possi ble, for virtually the first time in evolutionary history, to so overconsume sw eets that obesity and adverse health effects may follow. Yet it would be nonsen sical to argue that the modern maladaptiveness of sugar craving renders it not susceptible to sound evolutionary explanation. \par\par

Consequently, the robustness of an evolutionary argument cannot logically be jeopardized by modern maladaptiveness alone. n224 While a persuasive argument that forced copulation tended, on average, to reduce the inclusive fitness of m odern rapists would require explanation, the viability of n evolutionary theory is always best measured by how a behavior probably worked in our past, rather than by how it happens, in thoroughly new environments, to work in our present.

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n224. This point is elaborated in Thornhill & Palmer, supra note 14, at ch.

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L. The Argument from Incomplete Explanation\par

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Critics of the theories of evolutionary influences on patterns of rape quite f requently fault them for failing to explain all incidences of rape. For example , Akins and Windham reject biological hypotheses both because rape occurs in ma ny contexts where reproduction seems not to be a big component and because biol ogists have \22failed to establish that rape is one kind of act.\22 n225 Gave y and Gray say the theories cannot work because, after all, we know that some p re-and postreproductive females are raped, some victims are killed, and some ar e only raped anally. n226 And Baron adds that instances of male-male rape, oral rape, and penetration by objects are also known. n227\par

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n225. Kathleen A. Akins & Mary E. Windham, Just Science?, 15 Behav. & Brain Sci. 376, 376-77 (critiquing Thornhill & Thornhill, Evolutionary Psychology of Men's Coercive Sexuality, supra note 155); see also Raine, supra note 221, at 42-46. \par\par

n226. See Nicola J. Gavey & Russell D. Gray, Rape: The Perfect Adaptationist Story, 15 Behav. & Brain Sci. 386, 387 (1992) (critiquing Thornhill & Thornhill, Evolutionary Psychology of Men's Coercive Sexuality, supra note 155). \par\par

n227. See Baron, supra note 85, at 266, 271-72. Similar objections are raised in Val Dusek, Sociobiology and Rape, Science for the People, Jan./Feb. 1984, at 10, 15. \par

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There are four problems with this reasoning. First, biologists and nonbiologists often mean different things by the term 'rape' (for example, penile-vaginal intercourse, on one hand, and sexual penetration of any orifice, by any object, on the other), so it is not surprising that each often finds the other's explanations inadequate to explain rape as they choose to define it. \par\par

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Second, critics often misascribe the claims of evolutionists, and then measure the supposed failings of their theories by the yardstick of still unexplained phenomena that the theories never purported to explain in the first place. This comment is typical: 'Still, if a primary motive is reproduction, it is harder to understand instances of child sexual abuse, homosexual rape, or sexual harassment that occur without sexual intercourse.' n228 Since the evolutionary theories have never claimed even to explain all instances of penile-vaginal rape (what theory, life science or social science, explains all instances of any human behavior?), it is nonsensical to fault them for not explaining more. Behavioral theories stand or fall on their consistency with, and on their ability to make accurate predictions about, patterns (not individual people) and specific kinds of phenomena (not all phenomena a species is capable of generating).

A theory is properly judged by whether its own predictions are met, not by whether it meets the predictions of other theories.\par

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n228. Elizabeth Grauerholz & Mary A. Koralewski, What is Known and Not Known About Sexual Coercion, in Sexual Coercion, supra note 7, at 187, 192; see also Allison & Wrightsman, supra note 5, at 36 (arguing that the biological theories are insufficiently supported, because 'children, post menopausal women, and men, are also raped,' and some victims are killed); Kitcher, supra note 85, at 187 (Rape 'frequently takes place on juveniles, on women past the age of menopause, and on members of the same sex. Sometimes the victims die as a result of the rape. Actions of all these kinds contribute nothing to the spread of the rapist's genes.'). \par

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Third, the charge of incomplete explanation is deceptively rhetorical (and perhaps deeply hypocritical). Most credible social scientists themselves readily admit that rapes come in a variety of kinds, not every instance of which is explainable by whatever theory a theorist proposes. n229 Lines are properly drawn (such that, for example, rape theorists do not feel compelled to explain all a

cts of violence, including arson). Evolutionists, like all other theorists, are entitled to draw lines where they want, inasmuch as the ultimate check on overly aggressive and narrow boundary setting is perceived irrelevance in the marketplace of ideas.

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n229. Allison and Wrightsman, for example, argue that biologically-based theories are unlikely to be true, because they fail to explain many instances of rape. See, e.g., Allison & Wrightsman, supra note 5, at 36. Yet the major theme of the book is that in all likelihood rapists differ from one another, and that different rape scenarios require different explanations. See, e.g., id. at 4 (We argue that the act of rape would be better understood if everyone recognized the multiple motivations for sexual assault.)

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Fourth, and perhaps most significantly, this reasoning from counter-examples fails without recourse to frequency distributions. In statistical terms, it emphasizes the range and ignores the median. n230 Since the biobehavioral theories predict relative frequencies of different kinds of activity, it will hardly serve to discredit the theory that some observable activities could serve no useful reproductive function. For example, while it is true that some women are raped anally, it also appears to be true, as predicted by biobehavioral theories, that rapes involving anal penetration are far less prevalent than rapes involving vaginal penetration - comprising only a small fraction (two percent by one measure) of all rapes. n231

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n230. Even careful scholars make this error. See, e.g., Stock, supra note 181, at 65 (concluding that rapists see women as a gender class rather than as having individual characteristics because of the age range seen in female rape victims, extending from infancy to extreme old age); see also Hursch, supra note 128, at 78 (Since the recorded rapes for the full year cover an age range of victims from age three through seventy-four, and other sexual assaults were committed on victims from age two through eighty-six, it is clear that sexual attractiveness per se plays no part in many of these attacks.) In many cases, the emphasis on range over frequency distribution is implicit. See, e.g., Groth, supra note 33, at 7 (victims of rapists include males as well as females and occupy all age categories from infancy to old age).

n231. See MacDonald, supra note 148, at 68; supra note 134.

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M.

Ought-Is Errors: The Naturalistic and Moralistic Fallacies

Arguments reflecting ought-is errors come in two forms: The Naturalistic Fallacy and The Moralistic Fallacy. Common to each is the assumption that there is an automatic connection (running in either of two possible directions) between descriptive facts and normative conclusions.

\5B*894\5D The Naturalistic Fallacy is committed whenever one assumes that what is follows from what is, such that what is is what ought to be. Nineteenth century Social Darwinists, for example, bastardized the Darwinian reasoning of biologists by claiming, for political purposes, that those people at society's political and economic top deserved to be there by virtue of nature's design. The Naturalistic Fallacy inherent in such reasoning has long served as a warning to biologists and nonbiologists alike. However, when critics reject biological perspectives on the grounds that such perspectives explain rape as a phenomenon that lies outside the realm of moral judgment and that therefore the need and drive to reproduce by any and all means would sanction rape, they are simply incorrect. It is as incorrect to assume that biologists will commit The Naturalistic Fallacy as it is to commit it oneself. For while it is wise to be vigilant for this error in reasoning, one cannot legitimately conclude that if evolutionary theories of sexual aggression were true it would necessarily follow that rapists are not legally or morally responsible for their acts. Scientists exploring possible effects of evolutionary processes on the patterns of rape behavior in humans and other animals have gone to great lengths to underscore that the worlds of information and legal or moral implication operate independently.

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n232. The term was coined by G.E. Moore in *Principia Ethica* 62, 89-110 (Thomas Baldwin ed., 2d ed. 1993), but the concept traces to the 1888 edition of David Hume, *A Treatise of Human Nature* 469-70 (L.A. Selby-Bigge & P.H. Niddich eds., 2d ed. 1978).

n233. It was the Social Darwinist Herbert Spencer who coined and popularized the phrase "survival of the fittest" - which Darwin long resisted, because of its misleadingness. On Social Darwinism generally, see Richard Hofstadter, *Social Darwinism in American Thought* (1992).

n234. Akins & Windham, *supra* note 225, at 376-77.

n235. Ethel Tobach & Suzanne Sunday, *Epilogue to Sunday & Tobach*, *supra* note 45, at 136.

n236. Sarah Blaffer Hrdy believes that many modern thinkers, including feminists, have steadfastly resisted biological perspectives, in part, because they confuse Social Darwinian thinking with Darwinian thinking.

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Social Darwinism has, almost indelibly, tainted most people's understanding of evolutionary theory - certainly as it applies to human beings. Yet social Darwinism differs from Darwinism-without-adjectives in one all-important way, and ignoring this distinction has been one of the most unfortunate and long-lived mistakes of science journalism. Darwinism proper is devoted to analyzing all the diverse forms of life according to the theory of natural selection. Darwinists describe competition between unequal individuals, but they place no value judgment on either the competition or its outcome. By contrast, social Darwinists attempt to justify social inequality.

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Hrdy, *supra* note 85, at 12-13.

n237. For example, it is not irrational to be concerned that the public may commit The Naturalistic Fallacy when processing the evolutionary theories. But compare Dupre, *supra* note 159, at 382-83 (concluding that the danger is sufficiently great to reject the theories outright).

n238. See, e.g., Thornhill & Palmer, *supra* note 14, at ch. 1, ch. 5.

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The Moralistic Fallacy, in mirror image, is committed whenever one assumes that what follows from what ought, such that what ought to be is what is. Here, reality is somehow expected to conform to one's normative preference for the way reality best would be. While we may wish, for example, that patterns of human rape were unaffected by evolved brain architecture and predispositions, we cannot suppose that explanation follows inclination, and that facts follow preferences. Thus, while it obviously would be unsound to conclude that rape is acceptable simply because other species rape too, it is equally invalid to conclude that there are no biobehavioral influences on rape, simply because it may be offensive or undesirable that there be such influences.\par

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n239. For discussion of The Moralistic Fallacy, see Charles Crawford, The Theory of Evolution in the Study of Human Behaviour: An Introduction and Overview, in Handbook of Evolutionary Psychology: Ideas, Issues and Applications 9 (Charles Crawford & Dennis L. Krebs eds., 1998); Charles Crawford, Book Review, Genetic, Ethological, and Evolutionary Perspectives on Human Development, Evolution & Hum. Behav. (forthcoming 1999).\par

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N. Summary\par

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Biobehavioral theories of sexual aggression are not beyond constructive critique. Yet many of the most commonly encountered objections, categorized and explained in this Part, reveal unfortunate and generally counterproductive misunderstandings of evolutionary theory and behavioral biology. Avoiding them may help us identify what is useful in behavioral biology and employ that knowledge in efforts to reduce the incidence of rape. \par\par

IV Biobehavioral Theories of Rape: Evaluation to Integration\par

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Avoiding the many pitfalls detailed in the prior Part, we turn, in Section IV.A of this Part, to compare the current biobehavioral and sociocultural perspectives on rape. Upon concluding that the biobehavioral perspectives may be more useful than commonly supposed, Section IV.B considers how increased acceptance of those theories might affect several of the many tenets central to popular and law-animating theories of the causes and effects of rape. Section IV.C addresses how the life science and social science perspectives on rape - biobehavioral theories of ultimate causation and sociocultural theories of proximate causation - might be integrated and blended into a more accurate and comprehensive model of rape behavior, drawing on the strengths of each. Possible practical applications follow thereafter. \par\par

A. How Life Science and Social Science Theories of Rape Compare\par

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One problem with comparing social science and life science theories of rape causation is that the two traditions have a different meaning of theory. In the former tradition, a theory can be an idea or opinion that is plausibly argued. In the latter, plausibility is measured more strictly: A theory worth its title must generate predictions that are testable or falsifiable. And \par

in life science, among competing theories that explain the data equally well, the simplest and most parsimonious (the one requiring the fewest number of discrete assumptions) is generally considered the most likely. n240\par

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n240. See Hempel, *supra* note 100, at 40-45. \par
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Rather surprisingly, the overwhelming bulk of rape literature never articulates, or attempts to test, testable predictions. n241 So it is very difficult to assess how well the social science theories of rape measure up, in their current form, to life science theories. But the life science theories have generated a number of narrow and falsifiable predictions, which to date seem to receive support from existing empirical data on a wide variety of human and nonhuman species. Dispassionate assessment therefore suggests that the biobehavioral approach may be both accurate and parsimonious. Future studies may find contradictory data. But in the meantime, the continuity of data between nonhuman and human animals, on many different predictions, is sufficiently striking that if we were considering almost any context other than rape we might quickly credit it as persuasive. More than one respected scholar to look into the matter seriously has concluded that the biological evidence strongly suggests that rape is not independent of men's evolved sexual psychology. n242 Moreover, many of these apparent patterns of data, undiscovered or underemphasized before studies of forced copulation informed by behavioral biology appeared, are seemingly not predicted by popular sociocultural theories of rape alone.\par
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n241. See Del Thiessen & Robert K. Young, *Investigating Sexual Coercion*, *Soc'y*, March/April 1994, at 60. The authors report on their study of over 1610 studies of sexual coercion published between 1982 and 1992 in over 400 different journals or books, from the fields of psychology, educational psychology, anthropology, and sociology. They conclude that 'scientific methods are not being applied to the understanding of sexual coercion,' id. at 62, because, in part, 'hardly ever is a specific hypothesis tested,' id. at 60. Only 9% of the studies tested hypotheses, and less than 10% were directed at understanding causes of coercion. See id. at 61; see also Bourque, *supra* note 38, at 19 (noting that, for example, 'few explicit tests of hypotheses reflecting a feminist perspective have been made'). Two notable exceptions include James V.P. Check & Neil Malamuth, *An Empirical Assessment of Some Feminist Hypotheses About Rape*, 8 *Int'l J. Women's Stud.* 414 (1985); and Lee Ellis & Charles Beattie, *The Feminist Explanation for Rape: An Empirical Test*, 19 *J. Sex Res.* 74 (1983). \par\par
n242. See, e.g., Buss, *supra* note 101, at 164. \par
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For example, I can locate nothing in the social science rape literature that convincingly addresses or explains why the large-scale patterns of rape in humans demand a completely nonbiological theoretical foundation (and thus a necessarily less parsimonious one than the large-scale patterns of rape in other species require). Statistical outliers obviously can require different explanations

, and human rapes can include multiple layers of causation in addition to those apparently operative in many other species. But the wholesale rejection of evolved male-typical behavioral predispositions is, as yet, inadequately defended.

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Existing theories of human rape that do not include at least some measure of life science perspectives (integrating ultimate with proximate \5B*897\5D causation) also leave at least the following important questions unanswered:

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1. Why is rape overwhelmingly a male rather than female behavior in all species in which it is observed? n243 If evolutionary processes had no influence whatsoever, we would expect greater variability. Culture alone cannot explain this, because forced copulation occurs even in species to which culture is not typically attributed. Size alone cannot explain this (though sexual dimorphism itself must and can be explained in biological terms, but that is another matter) because males attempt to force copulation even in species in which males are no larger than females. Hostility, sex-role stereotypes, and exploitative intent cannot explain this, because these are functions of higher cognitive capacities, not exhibited by many species in which males rape.\par

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n243. See supra note 116 and accompanying text. \par

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2. Why does rape so rarely result in serious physical injury or death, across all populations of species in which it is observed, and across all the world's many human cultures? n244 If rape were just another kind of violence, we would expect greater variability in the extent of physical harm. The overwhelming absence of major physical damage in humans is particularly odd, given: (a) the possible penalties (rape is one of the three most harshly punished crimes in most societies); n245 (b) the typical use of some force to overcome victim resistance; (c) the supposed hostility underlying the rape; (d) the extent to which close proximity increases the probability that a victim can identify her attacker to authorities; and (e) the extent to which eliminating the witness could minimize the risk of being caught and punished. Men commonly maim or kill each other during hostile encounters. And they often kill witnesses to severely penalize crimes. Why so little of this with rape? n246\par

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n244. See supra notes 113-115 and accompanying text. \par\par

n245. See Tedeschi & Felson, supra note 116, at 334. \par\par

n246. Even if men, all across the planet, reached the common conclusion that rape was an even more intimidating form of disrespect than murder, it would beg the question why women all across the planet, for as long as any record exists, consider vaginal rape to be just about the greatest insult a woman can experience. \par

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3. Why are reproductive-aged victims of rape, in other species as well as our own, and across all human cultures, so overrepresented, compared to the population of all possible victims of rape? n247 If there were no evolutionary influ

ence, one would expect far greater variability among species, and, indeed, among human societies that differ in so many other respects. For example, if rapists selected females based primarily on physical vulnerability, this is precisely the age group that rapists would tend to avoid. If rapists selected females to punish for their exercise of power and political influence, this is again not the age distribution we would expect.

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n247. See supra notes 126-132 and accompanying text. \par
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4. Considering all the different kinds of sexual assaults on females of all ages, why are rapists more likely to rape reproductive-aged females penile-vaginally than they are to rape non-reproductive-aged females penile-vaginally? n248 This pattern does not appear to be derivable from the premises of those theories maintaining that sexual desire is irrelevant to rape.

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n248. See supra notes 133-136 and accompanying text. \par
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5. Why do reproductive-aged victims of penile-vaginal rape appear to be more traumatized, on average, than similar victims who are older or younger? n249 This pattern does not seem to follow from the theories that reject the influence of evolutionary processes on human psychology.

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n249. See supra notes 137-142 and accompanying text. \par
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6. From among all sexual assaults, why is vaginal rape, on average, apparently more traumatizing than oral or anal rape? n250 Absent evolutionary explanations, we would expect from the prevailing theories that either no pattern would emerge, or that, perhaps, anal rape would be more traumatizing (because it is equally invasive and more likely to result in physical injury).

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n250. See supra notes 143-145 and accompanying text. \par
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7. Why does the mean age of rapists remain at about twenty-five over time, when most rapists are never caught or punished? n251 If society alone socializes men to rape, it must also be extremely effective at reversing that process as they age. Otherwise, why would former rapists so uniformly stop raping, and all at about the same age? That is, why do young rapists, almost never apprehended, not become middle-aged and old rapists? n252

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n251. See supra notes 146-149 and accompanying text. \par\par

n252. I am aware of very few works in the social sciences that even address this question, let alone answer it. For example, Brownmiller & Mehrhof, supra note 218, at 382, attempt to explain this away by asserting, without evidence, that "the forcible rapist <elip> retires from the field when his legs give out." I find this hypothesis highly unlikely to explain why there are not significantly more former rapists continuing to rape in their 30s, 40s, and 50s, at the very least. \par

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8. Why does the age distribution for raped women differ so markedly from the age distribution of robbed women? n253 If the sexual psychology of rapists played no role in the selection of rape victims, one would expect the distributions of female victims by age to be relatively similar in rape and robbery contexts. \par

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n253. See supra notes 150-152 and accompanying text. \par

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9. Why does the age distribution for raped women differ so markedly from the age distribution of murdered women? n254 If rape were primarily a function of hostility toward women, one would expect the distributions in rape and murder contexts to be quite similar. \par

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n254. See supra note 132 and accompanying text. \par

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These are significant challenges. They suggest that a partnership between life sciences and social sciences is necessary to construct an adequate model of rape behavior, useful to law in helping to prevent rape. For even if scholars explain these phenomena by proffering theories that continue to reject behavioral biology (as I have found, in discussions, that some colleagues do), the theories still must survive scrutiny for parsimoniousness, and not appear to be completely ad hoc. \par\par

For it is always possible to explain any phenomenon, let alone these patterns of phenomena, with a more complicated theory than any given theory under consideration. And the ability to articulate a theory that can explain a pattern is still, from the scientific standpoint, a long way from qualifying as a theory worth scientific respect. What other falsifiable predictions does such a theory generate? How well do those fit with observable data? How well does the proposed theory connect into the large body of existing theories already deemed robust and reciprocally reinforcing? \par\par

We must not lose sight of the fact that a theory that rape is caused by sociocultural phenomena alone is necessarily less parsimonious, less simple, and less

ss connected to the larger body of scientifically robust theories than one posing the combination of interconnected evolutionary influences. A purely sociocultural theory therefore carries a heavier burden of persuasion than one that incorporates both the species' genetic history and its patterns of sociality and culture. This is so for two reasons. First, a purely sociocultural theory fails to explain strikingly similar patterns of rape in other species without similar cultures, and therefore erects a completely novel, disconnected, and additional assumption to explain causation in this one species all alone. Second, such a theory is simply ahistorical and without scientific foundation. It requires some plausible scientific explanation, not yet credibly tendered, of how the human brain evolved completely beyond the reach of the biological predispositions (sexual or otherwise) that not only played an undeniable role in human ancestors, but also continue to play a role in every other species on the planet. This is a big obstacle to a theory rejecting biology - something akin to explaining how one might begin construction of a building with the twentieth floor.

If the challenges of data explanation and parsimony cannot be met by theories unsupplemented by behavioral biology, two conclusions follow. First, there are several common assumptions, some of which undergird the law's behavioral models of rape and rape victimization, that may be untrue. Second, legal thinkers should pursue more aggressively the creation of an integrated model of rape behavior - one that blends social and life science perspectives.

B.

Metamyths of Rape

Rape researchers in the social sciences have quite usefully identified a large number of rape myths about causes and effects of rape, many of which are now popularly known. Although it is extremely rare for the term myth to be defined in the rape literature, it is generally clear from context that labeling something a myth is equivalent to saying that it is false or fictional, has no basis in fact, or is the product of erroneous or mistaken beliefs. For example, it is undeniably a myth that women as a group enjoy being raped.

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n255. The following are among the many rape myths so identified: (1) rape is rare or statistically insignificant; (2) women not only provoke rape, they enjoy it; (3) women cry rape only when they've been jilted or have something to cover up; (4) only bad girls get raped; and (5) any healthy woman can resist a rapist if she really wants to. See Hursch, *supra* note 128, at 74, 76; Martha R. Burt, *Cultural Myths and Supports for Rape*, 38 J. Personality & Soc. Psychol. 217 (1980); Jeffery Scott Mio & Jacqueline D. Foster, *The Effects of Rape upon Victims and Families: Implications for a Comprehensive Family Therapy*, 19 Am. J. Fam. Therapy 147, 148 (1991); Libby O. Ruch, *Review Essay, Sexual Violence Against Women*, 2 J. Hist. Sexuality 634, 634 (1992); Morrison Torrey, *When Will We Be Believed? Rape Myths and the Idea of a Fair Trial in Rape Prosecutions*, 24 U.C. Davis L. Rev. 1013 (1991).

n256. For sources using but not defining the term myth, see, for example, Lisa M. Cuklanz, *Rape on Trial: How the Mass Media Construct Legal Reform and Social Change* 14-32 (1996); Hilberman, *supra* note 41, at 3; Sue Lees, *Ruling Passions: Sexual Violence, Reputation and The Law* 6 (1997); Practical Aspect

s of Rape Investigation, supra note 6, at xiii-iv; Cathy Roberts, Women and Rape viii (1989); Sally K. Ward et al., Acquaintance and Date Rape: An Annotated Bibliography 3, 9 (1994); Halla Beloff, Foreword to Perspectives on Rape and Sexual Assault, supra note 186, at x, x; Edward Donnerstein & Daniel Linz, Sexual Violence in the Mass Media, in Violence and the Law 9, 22 (Mark Costanzo & Stuart Oskamp eds., 1994); Julius A. Gyls & John R. McNamara, Acceptance of Rape Myths Among Prosecuting Attorneys, 79 Psychol. Rep. 15 (1996); Mary P. Koss, The Measurement of Rape Victimization in Crime Surveys, 23 Crim. Just. & Behav. 55 (1996); Diana E.H. Russell, Pornography and Rape: A Causal Model, in Making Violence Sexy: Feminist Views on Pornography 120, 136-38 (Diana E.H. Russell ed., 1993); Seifert, supra note 196, at 55; Suzanne R. Sunday, Introduction to Sunday & Tobach, supra note 45, at 2, 6, 8; Ethel Tobach & Betty Rosoff, Preface to Sunday & Tobach, supra note 45, at xiii-iv. \par\par

n257. See, e.g., Groth, supra note 33, at 1; Ruth E. Hall, Ask Any Woman: A London Inquiry into Rape and Sexual Assault 69 (1985); Diana E.H. Russell, supra note 35, at 257-60; Carol Tavris, The Mismeasure of Woman 243 (1992); Ann Wolbert Burgess, Public Beliefs and Attitudes Toward Rape, in Practical Aspects of Rape Investigation: A Multidisciplinary Approach, supra note 6 at 3, 8; Mio & Foster, supra note 255, at 148 ('22falsity'22); Ruch, supra note 255, at 634 ('22debunked'22); Torrey, supra note 5, at 47 ('22false beliefs and stereotypes about rape'22); Julie A. Wright, Using the Female Perspective in Prosecuting Rape Cases, The Prosecutor, Jan./Feb. 1995, at 19, 22. \par\par

n258. See, e.g., Cuklanz, supra note 256, at 14-32; Hursch, supra note 128, at 67, 69. \par\par

n259. See, e.g., Hursch, supra note 128, at 74; Griffin, supra note 35, at 27. \par\par

n260. See, e.g., Cuklanz, supra note 256, at 16; Groth, supra note 33, at 1; Matoesian, supra note 30, at 13. This comports, in the main, with definitions, where they do appear. See, e.g., Denmark & Friedman, supra note 187, at 60 (comparing rape myths to other myths: '22imaginary, make-believe, unverifiable people or things, legend, tradition, phantasy, fiction and falsehood'22); Mary Margaret Fonow et al., Feminist Rape Education: Does It Work?, 6 Gender & Soc'y 108, 109 (1992) ('22A myth is a traditional story with ostensibly historical content that is neither a total fabrication nor the only story that can be told. '22); Odem & Clay-Warner, supra note 7, at xvi (rape myths '22are commonly held assumptions about rape that are untrue but that allow individuals to deny that forced sex is actually rape'22). \par

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Legal scholars have used the existence of these many myths to garner much-needed support for a variety of progressive rape reforms, which have helped to overcome unfair prejudices that disadvantage women and treat rapists more leniently than they deserve. This surely is a good thing. But as the political power of the myth label has grown, so have - perhaps inevitably - the number of beliefs seeming to warrant it. It is no longer clear who, if anyone, is assessing the accuracy of labeling beliefs myths. In some cases the use seems loose. And in some contexts scholars and writers in the popular press appear to have used a standard for applying the term myth that focuses more on the potentially detrimental effect of a belief on women's political progress than on the truth, falsity, or partial truth of the belief itself. n261 Obviously, these '22function'22 and '22falsity'22 tests for myth status often concur; many of the ideas that will serve women are indeed false. But it is error to assume that this is always so. n262\par

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n261. See, e.g., Susan Stefan, *The Protection Racket: Rape Trauma Syndrome, Psychiatric Labeling, and Law*, 88 Nw. U. L. Rev. 1271, 1319 (1994) (rape myths are a 'set of social assumptions about rape and the way raped women behave'). Some of this may be traceable to the disjunctive in Martha R. Burt's influential definition in Burt, *supra* note 255, at 217 (rape myths are 'prejudicial, stereotyped, or false beliefs about rape, rape victims, and rapists') (emphasis added). For an unusually blunt recognition of the extent to which myth status may not depend on actual falsehood, see Kimberly A. Lonsway & Louise F. Fitzgerald, *Rape Myths: In Review*, 18 Psychol. Women Q. 133, 136 (1994), who write, \par\par

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Although there may be a statistical 'kernel of truth' to 'some' myths <elip> their status as myths rests on their emphasis, exaggeration, and most importantly, possible function. The belief that only certain types of women are raped functions to obscure and deny the personal vulnerability of all women by suggesting that only other women are raped. \par\par

n262. Consider that normative judgments and facts exist independently. See *supra* Section III.L. Consequently, one cannot validly assume that beliefs about rape that are politically unpalatable, because of their potential for misuse, are necessarily false. \par

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Because the term 'myth' is so rarely defined and so unevenly used, n263 we have likely reached the point at which claims of myth status should be evaluated individually, rather than accepted on faith as an extrapolation of currently popular theories of rape. If the biobehavioral theories, which 'posit evolutionary influences on the way the human brain processes rape-relevant information are true, then they may help to further refine what are and are not myths or falsehoods about rape. Specifically, they may separate beliefs quite accurately labeled as false and mythical from what we might label metamorphs. I suggest this term to describe popularly maintained but false or inadequately demonstrated assertions, used in the otherwise laudable war on rape myths, that have been extrapolated beyond reality. n264 Here are some likely candidates.\par

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n263. Two scholars who have studied the subject concluded that 'the rape myth' literature reveals that researchers have generally failed to develop a thorough, theoretically based definition of rape myths, and in addition, have failed to use any definition consistently<Elip> 'The literature on rape myths' is characterized by considerable unevenness.' Lonsway & Fitzgerald, *supra* note 261, at 134, 155. \par\par

n264. In some contexts, metamorphs may include things that are prematurely or inaccurately labeled as falsehood and myth. In other words, a metamorph may also be the myth that something else is a myth, and thus something that has been falsely labeled false or mythically considered myth. These have sometimes been referred to as 'so-called myths' or 'myths-that-may-not-be-myths.' Bryden & Lengnick, *supra* note 5, at 1344. In my view, metamorphs are probably

y the by-products of an overzealous myth-identifying process. They presumably emerge from an academic telephone game, in which a narrowly identified and palpably false idea has, through the accumulation of many subtle changes during repetition, swelled to encompass even some true ideas, without shedding the label of falsity at the proper time. In the process, these metamyths accrue a secondary meaning, typically aligning more and more, over time, with the political preferences of those who repeat, and often unwittingly modify them. \par

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(1) The Metamyth that Only Humans Rape \par\par

Although it is still common in legal literature to encounter the assertion that 'no zoologist has ever observed animals raping their female mates in the wild or in captivity,'²⁶⁵ (that is, that nonhuman rape is a myth) it has been long clear that such a statement can be true only if one has implicitly defined rape so narrowly that it cannot, by definition, occur in another species. Forced copulation is commonly observable in many species, and has been for many years. ²⁶⁶\par

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²⁶⁵. Wallace, *supra* note 190, at 251. This metamyth of rape is likely traceable to Susan Brownmiller, who stated in Brownmiller, *supra* note 35, at 12, that 'no zoologist, as far as I know, has ever observed that animals rape in their natural habitat, the wild.' However, Lisa A. Binder notes that a court claimed the following as early as 1964, suggesting that this false belief has been around for some time. 'With More Than Admiration He Admired': Images of Beauty and Defilement in Judicial Narratives of Rape, 18 Harv. Women's L.J. 265 (1995). The court wrote, 'Man is the only member of the animal family of which we have any knowledge that is bestial enough to forcibly rape a female.' *Sims v. Balkcom*, 136 S.E.2d 766, 768 (Ga. 1964). \par\par

Unfortunately, the metamyth persists. See, for example, JoAnn Bren Guernsey, *The Facts About Rape* 10 (1990), a book for young adults in which the following passage appears: 'Myth: Rape is a natural form of aggression. Fact: Rape is not natural behavior; it is learned, apparently only by humans. No matter how aggressive they are, animals have not been observed to rape.' This metamyth continues to resurface in legal scholarship. See, e.g., Linda Robayo, Note, *The Glen Ridge Trial: New Jersey's Cue to Amend Its Rape Shield Statute*, 19 Seton Hall Legis. J. 272, 279 (1994) (citing Brownmiller in support of proposition that animals have never been observed to rape). \par\par

²⁶⁶. See *supra* notes 104-112 and accompanying text. \par

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(2) The Metamyth that Sexual Desire is Irrelevant to Rape \par\par

It is extremely common to encounter assertions that it is 'a fact' that rape has nothing to do with sex. ²⁶⁷ Observable patterns in existing rape data illuminated by biobehavioral theory, such as the striking parallel between risk of rape victimization and the female fertility curve, ²⁶⁸ make this conclusion highly suspect. It is important to stress that rape is not a sexual encounter of the consensual kind, and that rape should be punished as an impermissible act of aggression. But it does not follow from this that sexual desire is not an important causal factor in most rapes. Existing data have not yet been parsimoniously explained without recourse to the variable of gener

al sexual attractiveness as measured, in part, by being of reproductive age.\p
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n267. For example, Professor Susan Estrich has reportedly stated that '\22'\5Bjudges\5D have to deal with the fact \5Bthat rape\5D is not \5Ba\5D crime of sexual desire but brutal violence of the worst sort short of murder.\22 Allison & Wrightsman, supra note 5, at 240. \par\par
n268. See supra notes 126-132 and accompanying text. \par
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(3) The Metamyth of Equivalent Risk \par\par
Rape commentators often state or imply that, because rape has nothing to do with sex, and because very young and very old women have been raped, all women are equally likely to be attacked. n269 This is inconsistent with decades of statistics on victim age, and likely maintains, as an externality, a greater fear of rape among women outside the ages of high rape vulnerability than the statistical risk warrants. n270\par
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n269. See, e.g., Robert Ferguson & Jeanine Ferguson, A Guide to Rape Awareness and Prevention 16 (1994) ('\22Be aware, it can happen to anyone, anyplace, and at anytime. No one is exempt or excluded from rape.\22); Hursch, supra note 128, at 78 ('\22Since the recorded rapes for the full year cover an age range of victims from age three through seventy-four, and other sexual assaults were committed on victims from age two through eighty-six, it is clear that sexual attractiveness per se plays no part in many of these attacks.\22); Brownmiller & Merhof, supra note 218, at 382 ('\22\22Attractiveness' is not a dynamic in rape except in myth <Elip> Victims range in age from 3-month-old infants to 87-year-old grandmothers.\22); Stock, supra note 181, at 65 (arguing that rapists see women '\22as a gender class rather than as having individual characteristics. This accounts for the age range seen in female rape victims, extending from infancy to extreme old age.\22). In one survey of studies, in which the disproportionately small numbers of elderly victims was routinely present, an author, already convinced that sexual desire has nothing to do with rape, felt obliged to theorize why all the elderly rape victims were so much less likely to report being raped. See Groth, supra note 33, at 164-65, 173-74. The focus on range over frequency distribution can lead to overbroad prescriptions. See, e.g., Brande Stellings, The Public Harm of Private Violence: Rape, Sex Discrimination and Citizenship, 28 Harv. C.R.-C.L. L. Rev. 185, 198 (1993)\i0 ('\22Because one in five women will be raped, all women must conduct their lives in ways designed to minimize the risk of rape.\22). \par\par
n270. See supra notes 126-132 and accompanying text. \par
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(4) The Metamyth of Equivalent Harm \par\par
Some rape researchers claim that '\22the effect of rape is the same whether the victim is a young girl, virgin, mother, or old \5B*904\5D woman.\22 n271 This is speculation. It is important to note that some studies have found that the effect varies according to demographic variables (such as age and pres

ence of vaginal intromission) predicted by behavioral biology. n272\par

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n271. Deena Metzger, *It Is Always the Woman Who Is Raped*, 133 Am. J. Psychiatry 405, 406 (1976).\i0 \par\par

n272. See supra notes 137-145 and accompanying text. \par
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(5) The Metamyth of Equivalent Fear \par\par

There are a number of valuable discussions about the significance of the fear of rape. Scholars uninformed of behavioral biology, however, typically do not anticipate, look for, or find apparently existing patterns in varying magnitudes of fear. Therefore, they typically assume that fear varies only in random or culturally-created ways across the female population. n273\par

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n273. General statements are the norm, and the term 'women' comprises an undifferentiated supercategory. For example, while Gordon and Riger note in passing that there is some variation among women in fear, see Gordon & Riger, supra note 2, at 21, they generally imply that such variation is idiosyncratic, rather than patterned. They write that rape is 'a fear shared by women of all ages,' id. at xi, and that 'the only crime women fear more than rape is murder' Every woman has it to a degree, and all women are affected by it. Id. at 2-3; see also Clark & Lewis, supra note 149, at 23 ('The fear of rape affects all women. It inhibits their actions and limits their freedom, influencing the way they dress, the hours they keep, and the routes they walk. The fear is well founded, because no woman is immune from rape.'). cf. Mark Warr, *Fear of Rape Among Urban Women*, 32 Soc. Probs. 238 (1985) (finding that fear of rape is highest among women aged 19 to 35, nearly double their fear of murder), cited in Wright, supra note 257, at 21. \par\par

Professor Deborah Denno has begun to explore the extent to which sex asymmetries in evolved fear of rape may be relevant in legal contexts in Deborah W. Denno, *Evolutionary Biology and Rape*, 39 Jurimetrics J. 243 (1999).\i0 \par

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(6) The Metamyth of Wholly Learned Fear \par\par

It is common to encounter the assertion that women would not fear rape were they not taught and socialized to do so. n274 Again, this is speculation. The fact that the reactions to threat of rape and rape are uniformly extreme across all human societies, as well as the fact that extreme reactions are both predicted by evolutionary theory and consistent with the behavior of females across the rest of the animal kingdom, makes this assertion unlikely to be true. That is not to suggest that society cannot augment fear of rape. But it is to suggest that the fear of rape is a psychological predisposition in females.\par

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n274. According to two leading authors on the subject, female fear \par\par

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is a rational phenomenon resulting not only from women's personal backgrounds but also from what women as a group have imbibed from history, religion, culture, social institutions, and everyday social interactions. Learned early in life, female fear is continually reinforced by such social institutions as the school, the church, the law, and the press. Much is also learned from parents, siblings, teachers, and friends.\par

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Gordon & Riger, *supra* note 2, at 47. This and other passages reflect the implicit assumption that you have to 'teach' women to worry about rape.' 22 *Id.* at 67. Furthermore: \par\par

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To show power and anger through rape - as opposed to mugging or assault - men are calling on lessons women learn from society, from history and religion, to defile, degrade, and shame in addition to inflicting physical pain. Rapists have learned, as have their victims, that to rape is to do something worse than to assault; this sexualization of violence adds a range of long-term emotional consequences to the physical injury.\par

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Id. at 45. This notion has a long pedigree in rape literature: \par\par

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It is men, and not women, who have defined rape as the worst thing that can happen to a woman. For a man to have his exclusive sexual property defiled by an intruder is one of the worst things that can happen to him, but it most assuredly is not the worst thing that can happen to a woman, even though it frequently verges on this because of its accompanying risk. What woman would not rather have a penis inserted in her vagina, even against her will, than suffer death or mutilation? Women accept the judgment that rape is a disgrace because they, too, have been brainwashed into placing pre-eminent value on their sexuality, and because they know from experience that rape will, in fact, lead to their social and personal devaluation.\par

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Clark & Lewis, *supra* note 149, at 160. News accounts supposedly 'reinforce' what every woman has been taught from childhood - rape is the worst thing that can happen to a woman.' 22 *Id.* at 23. See also Griffin, *supra* note 35, at 47, who writes, \par\par

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Learning to fear is a process that begins at birth for women and continues throughout their lives. As is shown in Figure 9.1, the fear each woman experiences is the product of her own personal background as it intersects for her - in her own particular time and geographical and social space - with the forces of history and trends of contemporary times. It is striking that women respond so similarly to the threat of rape, both in their fear and in the precautionary strategies they adopt. Female fear has become a social fact.\par

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A more recent articulation of this same view appears in H.E. Baber, *How Bad is Rape?*, in Soble, *supra* note 186, at 243, 256: \par\par

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I suggest that the primary reason why rape is regarded as one of the most serious harms that can befall a woman is precisely because women are regarded as sex objects, beings who have little of value beyond their sexuality. Further I suggest that women who would regard being raped as the supreme violation and humiliation are implicitly buying into this view. If these are indeed the reasons why rape is seen as supremely harmful to women, as I suggest they are, then it follows that the suggestion that rape is the worst harm that can befall a woman is a consequence of sexist assumptions about the character and interests of women.

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(7) The Metamyth of Wholly Learned Rape

Scholars often assume that rape behavior must be 'learned.' For example, in her 1990 book, *Understanding Sexual Violence*, Diana Scully states, 'I assume that rape, for the most part, is socially learned behavior.' In contrast to the psychopathological model, this book is grounded in...the assumption that sexual violence is sociocultural in origin: men learn to rape. Although what 'learned' means in the rape context is rarely clarified, it is generally clear from context that 'learned' is intended to refer to a process uninfluenced by biology (except to the obvious extent that the learning takes place in the physical brain). That is not to say that proponents of biological theories of sexual aggression reject the significance of learning. Indeed, they embrace it, but within a context in which the brain's ability to learn is itself considered an evolved species-typical trait, with patterned information processing.

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n275. This conception dates back at least to 1971, and remains viable today. See, e.g., Allison & Wrightsman, *supra* note 5, at 16-17 (summarizing the social learning theory of rape); Tavis, *supra* note 257, at 243 (calling it a 'myth' that 'male sexuality is natural, unlearned'); Griffin, *supra* note 35, at 27 (comparing with study of other cultures suggests that 'in our society, it is rape itself that is learned'); Metzger, *supra* note 271, at 405-06 ('The rapist is educated to his behavior by his society,' and the cultural artifacts of rape images in literature, art, and myth, are 'social customs' that 'teach rape as a learned cultural activity'). It seems to be rooted primarily in the early feminist and sociological traditions. See, e.g., Amir, *supra* note 41, at 335 (the sociological viewpoint stresses that crimes are 'socioculturally learned behavior, committed within socioculturally defined situations'); Stock, *supra* note 181, at 68 ('Feminist theory contends that sexual coercion is learned').

For concise descriptions of how evolutionists understand these theories, see Ellis, *supra* note 30, at 12-14, 33-41; and Malamuth, who writes,

Since feminists attribute the origins of rape and other forms of violence to socialization within patriarchal cultures, they view individual differences among men as reflections of varied learning experiences, varied degrees of internalization of patriarchal values, and the extent to which violence is required and available to create and maintain dominance.

Malamuth, *supra* note 188, at 269, 270.

n276. Scully, supra note 1, at 59, 162. \par\par

n277. Scully, for example, added that \22the fundamental premise is that all behavior is learned in the same way - socially through direct association with others as well as indirectly through cultural contact.\22 Id. at 59. \par\par

n278. This is a dated conception for two reasons. First, forced copulation in patterns quite similar to that in humans is quite common in the animal kingdom, even among species, such as insects, with precious little capacity to \22learn.\22 See supra notes 104-112 and accompanying text. So the fact that it can exist in the absence of \22culture\22 places a significant burden of proof on those who would assume and assert that, in humans, culture alone explains it. Second, and more importantly, learning is itself biological. The capacity to learn is an evolved trait. The brain is no longer thought to be a general-purpose information processor, as if it had the capacity to do anything equally well, and simply awaited instructions. The brain is an organ that must be understood in light of evolutionary history, just like every other aspect of human physiology. It evolved to process information in historically adaptive ways, and it analyzes, sorts, remembers, and discards information in decidedly nonrandom ways. Learning is itself influenced by evolutionary history, and that history explains, in part, why some things are easier to learn than others. See supra note 65 (describing Garcia effect). See generally Pinker, supra note 48, at 19 (protesting against the idea that there is \22some single master force or mind-bestowing elixir like \22culture,\22learning\22). \par\par

n279. See, e.g., Thornhill & Thornhill, supra note 65, at 95 (\22We emphasize that the view of men's sexual psychology proposed by the hypothesis of adaptation to rape does not imply the absence of learning....\22); Thornhill & Thornhill, Evolutionary Psychology of Men's Coercive Sexuality, supra note 155, at 364-65 (\22The hypothesis of rape-specific adaptation does not assume that there is no learning or sex-specific socialization in the development of human sexuality.\22). \par\par

n280. See, for example, Malamuth, supra note 188 where the author claims: \par\par

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Theories emphasizing the role of learning or culture are not alternatives to theories encompassing the role of evolutionary processes since what can be learned and how learning takes place are determined by the characteristics of the evolved mind of a species<Elip> \5BA\5D comprehensive theory needs to incorporate understanding of the design of the mind, as formed by evolutionary processes and as it interacts with the physical and social environment, including the cultures created by those minds<Elip> The role of learning can only be properly understood in the framework of the mind that translates environmental input into behavior, both throughout the lifespan and in the immediate situation.\par

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Id. at 273, 280; see also Thornhill & Thornhill, Coercive Sexuality of Men, supra note 65, at 95 (\22The learning process involved is not arbitrary but instead is guided by evolved sexual psychological adaptations that bring about selective perception, cognition, memory, and information evaluation specific to rape.\22). \par

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Law works best when its predicates are sound, not when these predicates are based in myth. Flawed behavioral models bring flawed remedial plans. And uncrit

ical acceptance of the popularly drawn lines between myth and fact may lead law makers into unproductive side eddies of legal effort. The many false and damaging beliefs properly labeled myths should continue to be fought by all who oppose rape. But so should the metamyths of rape, for these too may hinder the very efforts to reduce the incidence of rape that their proponents support. Biobehavioral theories may help bring a clarifying light to distinguishing the substantively real from the simply asserted.

C. Toward an Integrated Model of Rape

In sum, we have passed the point of pitting life science and social science theories of law-relevant behaviors, including rape, against each other. Although the legal community has been slow to realize it, there simply cannot be a meaningful gulf between these supposed extremes. The human brain cannot develop adequately without rich environmental stimuli, but stimuli cannot be perceived and analyzed except through a brain every bit as evolved to function in patterns reflecting adaptive evolution as the rest of the organs in the body. Because they are more accurate and provide a better fulcrum against which law can leverage behavioral models that ensure consistency between life and social science insights are necessary to law.

Moreover, there is no longer a question whether humans have evolved psychologies that predispose us to nervous system states (emotional and otherwise) that increase the likelihood of some behaviors and decrease the likelihood of others. There are simply too many findings consistent with robust life science principles to maintain otherwise.

Instead, the questions now are two: (1) how might we periodically identify and integrate the best principles of biobehavioral theories with the best from other theories; and (2) how might such integration improve our abilities to reduce the incidence of behavior we judge to be unacceptable? The remainder of this Section takes up the first question, while Part V, below, takes up the second.

A number of influential scholars have already begun attempting to integrate previously isolated life science and social science rape theories. And these efforts may prove useful to law. But legal thinkers will need a framework for understanding how integration of life and social science perspectives on rape can proceed.

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n281. See, e.g., Ellis, *supra* note 30; Lee Ellis, A Synthesized (Biosocial) Theory of Rape, 59 J. Consulting & Clinical Psychol. 631 (1991); Cheryl Hanna, Can a Biological Inquiry Help Reduce Male Violence Against Women?, 22 Vt. L. Rev. 333 (1997); Malamuth, The Confluence Model, *supra* note 188; Malamuth, An Evolutionary-Based Model, *supra* note 102; Malamuth & Malamuth, *supra* note 13.

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The purpose of integration, from law's perspective, is to construct a generally superior theory and model of the behavior that legal reform can address. Such a model would unify existing knowledge, be historically accurate, and use a basic understanding of evolved psychology to bridge the distance between the subjects that evolutionary biologists study and the subjects that sociologists, feminists, economists, and historians study.

Whichever biobehavioral theories of rape happen to emerge as most persuasive

over time, it is overwhelmingly likely that they will derive from the principles of natural and sexual selection. From law's perspective, life science insights about the processes and patterns of sexual selection may provide a missing piece of the explanatory puzzle or even an overarching framework that enables patterns of rape in humans to make sense - sense not only within the context of rape, but also within the whole universe of animal behavior. \par\par

An integrated, blended, holistic understanding of rape would categorize some rape behavior (remember we are focusing on forcible male-female intercourse) within the larger context of mate-seeking behavior, mate-seeking behavior within the larger context of overlapping but nonidentical reproductive strategies of males and females, and those strategies themselves within the larger context of evolutionary processes, including natural and sexual selection. Taking it from the top, natural selection rewarded with persistence through time those traits that contributed toward their own replication. These traits, mixed in varying combinations, yielded genetically influenced patterns of morphology and behavioral dispositions constituting reproductive strategies, the distinctions among which mark the boundaries of what we now call species. Our own species reflects both sexual reproduction, enabling male-female conflicts in mating interests, as well as unusually high maternal investment per offspring in gestation and nursing, virtually guaranteeing them. \par\par

Most males and females will seek mating opportunities with the opposite sex, but they will tend to do so in ways that reflect the differences to each sex in the potential costs and benefits of each copulation. These differences were inescapable during the long precontraceptive environment of evolutionary adaptation. And because females provide a larger minimum investment in each offspring, they are choosier about their mates than vice versa. \par\par

Historically adaptive female selectivity in choosing sexual partners can optimize female reproductive success only by imposing limits on individual male reproductive success. Since male reproductive success can increase more easily as mere mate number increases, there typically have been more males seeking copulations from unwilling females than females seeking copulations from unwilling males. Sexual selection is therefore powerfully likely to contribute to the emergence, from the collected behaviors of many individuals, of nonrandom patterns of sexual coercion and victimization: more male than female sexual coercion, and sexual coercion directed primarily by males toward reproductive-aged females. \par\par

\5B*909\5D But these processes of ultimate causation will intertwine with proximate causes. Things that increase a male's unattractiveness (such as poverty) or that increase his perceptions of impunity (such as political power or legally favorable conditions) may exacerbate biobehavioral predispositions toward sexual aggressiveness, because they are likely to be condition-dependent. n282 So, too, may things that disinhibit violence against women, such as alcohol and drugs, easy access to intimidating weapons, n283 cultural factors undermining respect for women and bodily autonomy, prior victimization at the hands of sexual abusers, n284 and widespread messages that sexual aggression is insignificant, desired by women, or otherwise unobjectionable. Similarly, environmental factors that decrease female power, such as isolation, unequal economic and political clout, and ineffective enforcement of anti-rape prohibitions, may tend to increase the incidence of sexual aggression. n285\par

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n282. See supra notes 117-125 and accompanying text. \par\par

n283. My thanks to Professor Todd Zywicki for this observation. \par\par

n284. See DOJ Statistics, *supra* note 6, at vi ('22Sexual assault offenders were substantially more likely than any other category of offenders to report having experienced physical or sexual abuse while growing up.'22). \par\par

n285. Nadler offers similar conjectures in Nadler, *supra* note 13. \par
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This view is, in part, compatible with some social science perspectives. But the real breakthrough of a behavioral model that integrates life and social sciences is that it significantly increases our ability to view rape in contexts that illuminate causal influences. Rape is no longer viewed as an isolated and discrete behavior, as has been the case historically, or simply as a subset of violent behaviors, as has more recently been the case. Instead, it can be seen as but one behavior among many, all organizable and understandable (though not, of course, excusable) as a function of an evolved, species-typical psychology. The next Part explores some possible implications such a view may have for law

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V Legal Applications\par

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Suppose that biobehavioral influences do indeed contribute to the incidence and patterns of human rape, and that the legal system ultimately incorporates a model of rape behavior that blends life science and social science perspectives into a seamless whole of integrated knowledge. What then? A scientific explanation has no independent normative content, and therefore offers no guidance by itself on appropriate policy. Explanation is not justification, and evolutionary analysis is only useful where we want it to be, helping us reach our goals, not setting them. \par\par

Nevertheless, this potential to assist our pursuit of separately formulated legal goals is quite palpable. As I have argued elsewhere, n286 '5B*910'5D evolutionary analysis in law can prove useful in at least four general ways. First, it can help us to refine the models law uses to predict the incidence of law-relevant behaviors reflecting human evolved psychology. For example, it helps us integrate proximate and ultimate causes of behavior into a more holistic framework. In doing so, it adds historical dimension; it facilitates a deeper appreciation of the complex and dynamic interaction of genetic and environmental factors that affect the behaviors law seeks to regulate; it more narrowly identifies environmental conditions likely to increase or decrease the probability of behaviors; and it reveals opportunities to improve prevailing theoretical models. Second, these improvements in behavioral models can, in turn, help generate new legal strategies for addressing behaviors lawmakers seek to regulate. Third, evolutionary perspectives can often clarify cost-benefit analyses regarding the implementation of legal policies by identifying previously unnoticed connections between policies, and by helping us quantify the trade-offs that may arise when zealous pursuit of one policy may impede effective pursuit of another. Fourth, evolutionary analysis in law can help point legislatively funded research in directions that may provide further utility to law's regulatory efforts

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n286. See Jones, *Evolutionary Analysis in Law*, *supra* note 11, at 1226-41. \par
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It is beyond the scope of this Article to identify every diverse legal implication that might follow from the formulation of a robust biobehavioral theory of rape. It is also beyond the scope to explore, in light of the many contemporaneous policy goals that exist in some tension with one another, the wisdom of specific changes to the legal system that evolutionary analysis could arguably further. Some preliminary speculation, however, may be useful in suggesting topics for further scholarship that may mine these potentially rich and effective applications. \par\par

Let us briefly suppose that either of the two most viable theories is accurate. That is, let us suppose that natural and sexual selection have operated over long periods of evolutionary history to preserve and spread psychological predispositions, in males, to correlate psychological states tending to increase the likelihood of forceful copulation with circumstances that would, on average, have made forced copulation more adaptive than alternative behaviors during the environment of evolutionary adaptation. \par\par

If so, I believe that what does not automatically follow, for law, may be equally important to articulate as what might follow. It does not follow, for example, that rape is inevitable. It does not follow that rape should be tolerated. n287 It does not follow that the legal system should be less aggressive about preventing rape, encouraging victims to report it, or prosecuting its commission. It does not follow that accused rapists should be allowed to raise biology in furtherance of exculpatory arguments, claiming that male evolved psychology absolves them from guilt. n288 It does not follow that the legal system should be more lenient toward convicted rapists. It does not follow that victims should be blamed for their rape. It does not follow that evolutionary psychology will have much to contribute to criminal trials, in which specific males are being charged with the commission of specific rapes. And it does not follow that political, social, and legal changes will have little effect on rape. \par

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n287. It is unfortunate that evolutionary explanations of rape have been repeatedly confused with justifications for rape. Thornhill & Palmer, *supra* note 14, at ch. 5. \par\par

n288. See, e.g., Oliver R. Goodenough, *Biology, Behavior, and Criminal Law: Seeking a Responsible Approach to an Inevitable Interchange*, 22 *Vt. L. Rev.* 263 (1997). Professor Deborah Denno also provides a comprehensive treatment of why biology will typically not exculpate or mitigate criminal responsibility in *Deborah W. Denno, Human Biology and Criminal Responsibility: Free Will or Free Ride?*, 137 *U. Pa. L. Rev.* 615 (1988). \par

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Let us also suppose that natural and sexual selection have long favored and spread predispositions, in females, to respond to forced copulation and the threat or risk thereof in ways sensitive to demographic variables, such as age, historically associated with the reproductive consequences rape can create. It does not follow that the fear or pain of rape is likely to be lesser, or any less real, for victims using contraceptives. It does not follow that any individual victim, outside the reproductive ages, will necessarily be less traumatized than those within them. It does not follow that the legal system should limit female rather than male behavior, as an acceptable pathway for reducing rape. \pa

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Here are, however, a few brief illustrations of the variety of possible contexts, worthy of future discussion, in which evolutionary analysis might affect the law of rape. Topics discussed below include: (a) probation and parole alternatives, such as in the debate over chemical castration; (b) contextualizing victim trauma; (c) rape motivation legislation and litigation; (d) rape classification in criminal statutes; (e) hidden policy tensions in prostitution; (f) evidence at civil rape trials; and (g) the legal and comparative history of rape law. It is also possible that evolutionary psychology will have useful things to contribute in the context of interpreting the competing perspectives, in the date-rape context, of whether or not a woman consented to intercourse. It also may offer a basis for considering whether, given the likely fact-patterns and psychologies involved, and the goals lawmakers seek to achieve, statutory rape language should be gender neutral or gender specific. \par\par

It bears repeating, at the outset, that in each context a biologically informed model of rape behavior leads to no automatic policy position - conservative, liberal, or otherwise. Such a model provides raw information, the utility of which depends on typically preexisting values and goals, such as reducing the incidence of rape, fostering cost-effective government, basing legal decisions on empirically accurate truths, and the like. These, clearly, will vary among legal thinkers. \par\par

A. Probation, Parole, and Sentencing Schedules\par

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Several of the clearest applications of this evolutionary analysis of rape behavior are likely to be in the context of probation, parole, and sentencing schedules. This Section explores two possible applications, one in the context of the chemical castration debate, and the other in the context of statutorily prescribed rape sentencing schedules that vary with victim age. \par\par

1. Example: The Chemical Castration Debate\par

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Rapists are sentenced, and sometimes paroled, in furtherance of several different goals, such as retribution, rehabilitation, deterrence, and the like. The content and form of judicial sentencing (which may include the imposition of probationary measures), as well as typically administrative parole decisions, each of which are often the subject of state statutes, are undoubtedly often affected by prevailing theories of why sexual aggression occurs. Perhaps the most direct application of biobehavioral theories of rape to postconviction contexts is in the area of so-called chemical castration,²⁸⁹ which reduces male sex drive, in furtherance of law's efforts to reduce recidivism.\par

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²⁸⁹ Chemical castration involves regular chemical injections of, for example, medroxyprogesterone acetate (commonly known as Depo-Provera). These injections shrink the testicles, inhibit the release of testosterone and other hormones that affect the brain's ability to sexually fantasize, and reduce sex drive in men. The effects are thought to be reversible. See Daniel L. Icenogle, Sentencing Male Sex Offenders to the Use of Biological Treatments, 15 J. Legal Med. 279, 286 (1994); Karen J. Rebish, Nipping the Problem in the Bud: The Constitutionality of California's Castration Law, 14 N.Y.L. Sch. J. Hum. Rts. 507, 516-17 (1998). \par

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Whether chemical castration is both effective and legally permissible for rapists has been hotly debated for years. n290 (The first convicted rapist to receive chemically castrating injections as a condition of probation in the United States was Joseph Frank Smith, of San Antonio, Texas, in 1983.) n291 Recently six states have enacted legislation allowing (and in some cases requiring) chemical treatments of certain sex offenders, including rapists. n292 At least twenty-two other state legislatures have considered similar legislation, n293 and bills apparently remain pending in six of them. n294 While many different scientific, legal, and policy issues are involved, n295 behavioral biology is relevant to these developments in at least two ways.

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n290. See, e.g., William L. Baker, *Castration of the Male Sex Offender: A Legally Impermissible Alternative*, 30 Loy. L. Rev. 377 (1984); William Green, *Depo-Provera, Castration, and the Probation of Rape Offenders: Statutory and Constitutional Issues*, 12 U. Dayton L. Rev. 1 (1986); Icenogle, *supra* note 289; John S. Murray, *California's Chemical Castration Law: A Model for Massachusetts?*, 24 Crim. & Civil Confinement 731 (1998); Rebish, *supra* note 289; Larry Helm Spalding, *Florida's 1997 Chemical Castration Law: A Return to the Dark Ages*, 25 Fla. St. U. L. Rev. 117 (1998); Jodi Berlin, *Note, Chemical Castration of Sex Offenders: A Shot in the Arm Towards Rehabilitation*, 19 Whittier L. Rev. 169 (1997); Jennifer M. Bund, *Comment, Did You Say Chemical Castration?*, 59 U. Pitt. L. Rev. 157 (1997); Alison G. Carpenter, *Comment, Belgium, Germany, England, Denmark and the United States: The Implementation of Registration and Castration Laws as Protection Against Habitual Sex Offenders*, 16 Dick. J. Int'l L. 435 (1998); Kenneth B. Fromson, *Note, Beyond an Eye for an Eye: Castration as an Alternative Sentencing Measure*, 11 N.Y.L. Sch. J. Hum. Rts. 311 (1994); Pamela K. Hicks, *Comment, Castration of Sexual Offenders: Legal and Ethical Issues*, 14 J. Legal Med. 641 (1993); Bryan Keene, *Note, Chemical Castration: An Analysis of Florida's New Cutting-Edge Policy Towards Sex Criminals*, 49 Fla. L. Rev. 803 (1997); Kimberly A. Peters, *Comment, Chemical Castration: An Alternative to Incarceration*, 31 Duq. L. Rev. 307 (1993); Kari A. Vanderzyl, *Comment, Castration as an Alternative to Incarceration: An Impotent Approach to the Punishment of Sex Offenders*, 15 N. Ill. U. L. Rev. 107 (1994).

n291. See Allison & Wrightsman, *supra* note 5, at 239.

n292. These states include California, Florida, Georgia, Louisiana, Montana, and Wisconsin. For a helpful overview of pending legislation, as of its date of publication, see Beth Miller, *A Review of Sex Offender Legislation*, 7 Kan. J. L. & Pub. Pol'y 40 (Spring 1998).

n293. Bills allowing chemical castration have been introduced in the legislatures of Alabama, Arizona, Colorado, Delaware, Hawaii, Iowa, Maryland, Michigan, Missouri, Mississippi, New Hampshire, New Jersey, New Mexico, Nevada, New York, Oklahoma, Oregon, South Carolina, Tennessee, Vermont, Washington, and West Virginia.

n294. These six states are: Delaware, Hawaii, Michigan, New Jersey, New York, South Carolina.

n295. These include, for example, the extent to which chemical treatments affect different kinds of sex offenders, the extent to which side effects of chemical treatment are reversible, whether chemical castration is cruel and unusual punishment prohibited by the Eighth Amendment, whether there is a First Amendment right to fantasize sexually, and whether chemical castration transgresses privacy and individual liberty rights under the Fourteenth Amendment. See genera

lly sources cited supra note 290. \par

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First, the advisability of supporting chemical castration initiatives depend s in part on the likelihood that chemical castration will in fact reduce recidi vism. Chemical castration, like surgical castration, reduces the production and effects of testosterone. The male brain functions differently in the presence or absence of different hormones, and in this case decreasing testosterone decr eases sexual desire. Consequently, the likelihood of reducing recidivism throug h chemical castration depends, in part, on the extent to which the likelihood o f raping is in fact influenced by sexual desire. \par\par

From the evolutionary perspective, sexual desire is likely to be a significa nt contributor to rape patterns. Chemical castration should therefore be effect ive at lowering rape recidivism rates. Empirically, existing data on recidivism rates after chemical castration are few and unclear. n296 Recidivism of previo usly incarcerated rapists is generally considered to be quite high, n297 althou gh here, too, studies employing different methodologies vary considerably. n298 Data on paraphiliacs, who exhibit a pattern of sexual arousal characterized by a specific fantasy, clearly indicate that chemical treatments dramatically red uce recidivism rates. n299 But there are far less \5B*914\5D data on rapi sts generally. Norwegian and Danish studies tend to support the conclusion that surgical castration, at least, lowers rapist recidivism rates dramatically. n3 00 But most such studies are dated, based on small samples, or both. Studies on chemically treated \22sexual aggressives,\22 some of whom were rapists, sugg est recidivism rates lower than those for untreated sexual aggressives. n301 Bu t the results, while generally consistent with prediction, are not fully compel ling. So the effectiveness of existing state chemical castration initiatives re mains to be convincingly demonstrated. Behavioral biology does, however, sugges t a firm theoretical basis for further exploring the use and effectiveness of c hemical castration as a means of reducing recidivism. Indeed, if rape behavior is at all increased by reduced access to willing sex partners, and if having be en incarcerated makes one a less desirable sex partner than before (through dec reased status and opportunity cost to lifetime earnings) incarceration might ma rginally increase the likelihood of recidivism.\par

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n296. See Vanderzyl, supra note 290, at 116-17 (citing studies). \par\par

n297. See, e.g., Gene G. Abel et al., The Components of Rapists' Sexual Arou sal, 34 Archives Gen. Psychiatry 895 (1977) (estimating recidivism rate at 35%)

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n298. See Marnie E. Rice et al., A Follow-up of Rapists Assessed in a Maximu m-Security Psychiatric Facility, 5 J. Interpersonal Violence 435 (1990) (discus sing studies, statistics, and variables). \par\par

n299. .See Icenogle, supra note 289, at 287, and sources cited therein. \pa r\par

n300. See Baker, supra note 290, at 384 (citing and discussing studies). One more recent report suggests that surgically castrated sex offenders have a 3% recidivism rate, while uncastrated sex offenders have a recidivism rate of roug hly 46%. See Jennifer Nadel, Castration Was My Cure, Sunday Telegraph (London), July 24, 1994, at 12. The latter figure approximates a 52% re-arrest rate, wit hin three years of prison release, for convicted rapists in the United States.

See David Gelman et al., The Mind of the Rapist, Newsweek, July 23, 1990. \par \par

n301. See Fred S. Berlin et al., A Five-Year Plus Follow-Up Survey of Criminal Recidivism Within a Treated Cohort of 406 Pedophiles, 111 Exhibitionists and 109 Sexual Aggressives: Issues and Outcome, 12 Am. J. Forensic Psychiatry 5, 22 (1991); Walter J. Meyer III et al., Depo Provera Treatment for Sex Offending Behavior: An Evaluation of Outcome, 20 Bull. Am. Acad. Psychiatry L. 249, 254-55 (1992). \par

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One difficult aspect of weighing the advisability of chemical castration alternatives to preexisting legal treatment of rapists is that while evolutionary biology predicts that chemical castration will decrease recidivism among treated rapists generally, because sexual desire plays some role in the average rape, it may not prevent recidivism in all cases. We therefore may anticipate that one cost of chemical castration policies will be those rapes that would not have occurred under traditional sentencing and parole procedures. This cost, however, must be compared to the cost to society, measured by the recidivism of released rapists not chemically castrated. \par \par

Second, behavioral biology is relevant to the permissibility of chemical castration. Challenges to chemical castration statutes (including one apparently planned by the American Civil Liberties Union) n302 are expected to raise First, Eighth, and Fourteenth Amendments issues, among others. Under the Eighth Amendment prohibition against cruel and unusual punishment, for example, if chemical castration is an aspect of state punishment, it could be held unconstitutional if it is either unnecessary or applied \5B*915\5D arbitrarily. n303 Again, whether chemical castration is sufficiently necessary and nonarbitrary depends, in part, on the extent to which rape is in fact typically influenced by sexual desire. \par

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n302. See Miller, supra note 292, at 57. For speculation about legal arguments likely to be raised, see id.; Murray, supra note 290. \par \par

n303. See *Furman v. Georgia*, 408 U.S. 238, 281-306 (1972) (Brennan, J. concurring) (articulating, in context of racially-biased death sentences, how these commonly used constitutional tests are employed); see also Bund, supra note 290 (evaluating a number of constitutional challenges to chemical castration). \par

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When legal thinkers assess the advisability and constitutional permissibility of chemical castration, the theory of rape causation carries great weight. If rape behavior is not significantly influenced by the biology and evolutionary history of sexual desire, then the advisability and constitutionality of chemical castration as a sentencing alternative, supplement, or condition of parole is harder to defend. n304 A great many commentators today, n305 including a number of legal thinkers, n306 subscribe to the following view: \par

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n304. For a discussion about how evolutionary analysis might, among other th

ings, make physical castration an effective deterrent and punishment, see Becks
trom, supra note 15, at 53-65. \par\par

n305. See Green, supra note 290, at 8 (reporting views of other commentators
that reducing a rapist's sexual drive will only result in his exercising devia
nce in other ways); Hicks, supra note 290, at 647 (noting that \22many expert
s say that castration will not work because rape is not a crime about sex, but
rather a crime about power and violence.\22). \par\par

n306. See, e.g., Bund, supra note 290, at 188-89. \par
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Because \5Brapists\5D conduct is often motivated by anger and hatred rather
than sexual desire, a treatment that merely curbs sexual desire bears no reaso
nable relationship to the offender's criminal behavior<Elip> Because \5Brapist
s\5D are motivated not by sexual drive, but by intense feelings of hatred and
hostility, the procedure may cause an increase in the occurrences of this type
of sexual battery. n307\par

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These critics maintain that the effect of chemical castration on recidivism is
likely to be low because rape is primarily a crime of violence, not sexual des
ire (The Error of the False Dichotomy), n308 and because treated rapists are th
erefore likely to find other ways of expressing the same antipathy toward women
. If, however, rape behavior is significantly affected by male biology, psychol
ogy, and evolutionary history, as the biobehavioral theories and data seem to s
uggest, then chemical treatment may reduce the recidivism rate further than inc
arceration alone. This would render chemical castration sufficiently effective
to be seriously considered, and sufficiently nonarbitrary to be constitutionall
y permissible.\par
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n307. Spalding, supra note 290, at 132-33 (citations omitted). The quoted la
nguage contrasts the possible utility of chemical castration of paraphiliacs wi
th the chemical castration of other sex offenders, including most rapists. But
see Icenogle, supra note 289, at 281-82 (suggesting that chemical castration ma
y be useful at least for those rapists who do have sexual fantasies). \par\par

n308. See supra notes 157-171 and accompanying text. \par
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Of course, there are other values at work here. We are generally hesitant (i
n a fashion undoubtedly susceptible of evolutionary analysis) to have \5B*91
6\5D our legal system interfere with procreative liberties. n309 And to the
extent that chemical castration may do so, we are properly cautioned. Neverthel
ess, the effects of chemical castration are apparently reversible. Therefore th
ey likely have, at worst, no more effect on a rapist's future reproduction than
does a similar period of incarceration. This makes chemical castration a more
appealing alternative to, for example, surgical castration.\par
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n309. See, e.g., *Planned Parenthood v. Casey*, 505 U.S. 833, 849, 851 (1992) ('The Constitution places limits on a State's right to interfere with a person's most basic decisions about family and parenthood,' such as 'personal decisions relating to marriage, procreation, contraception, family relationships, child rearing, and education.'). *Eisenstadt v. Baird*, 405 U.S. 438 (1972) (holding state statute impairing access to contraceptives unconstitutional); *Griswold v. Connecticut*, 381 U.S. 479 (1965) (same); *Sinker v. Oklahoma*, 316 U.S. 535 (1942) (holding state statute requiring sterilization of certain habitual criminals unconstitutional). \par

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2. Example: Punishments Varying by Victim Age\par

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In some jurisdictions, rapists are statutorily subject to different incarceration periods depending on the age of their victim. In Illinois, for example, the victim's age at the time of rape ('criminal sexual assault') has potentially serious consequences for the rapist's sentence. Far longer prison terms may be imposed if the victim is under the age of thirteen or over the age of fifty-nine. n310\par

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n310. Compare 720 Ill. Comp. Stat. Ann. 5/12-13 (West 1993 & Supp. 1997) (criminal sexual assault), with 720 Ill. Crim. Stat. Ann. 5/12-14 (West 1993 & Supp. 1997) (aggravated criminal sexual assault). Under the Illinois statute, criminal sexual assault, a Class I felony, carries a prison term of 4 to 15 years, see 730 Ill. Comp. Stat. Ann. 5/5-8-1(a)(4) (West 1997), while aggravated criminal sexual assault, a Class X felony, carries a prison term of 6 to 30 years. See 730 Ill. Crim. Stat. Ann. 5/5-8-1(a)(3) (West 1997). \par

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There are a wide variety of reasons why it might be appropriate for rapists targeting victims in these age ranges to be singled out for special punishment.

One of those reasons might be the belief that victims in these age ranges are more likely to be targeted than victims of other ages (on the theory, perhaps, that rapists preferentially target the most vulnerable women), and that increasing penalties will increase deterrence of crimes committed against women of those ages. Another reason might be the belief that victims in these age ranges are more likely to be more traumatized by rape than victims of other ages, and that therefore that the penalty should be increased as the harm inflicted is increased. A third might be that the public finds rapes of females in these age groups particularly offensive. \par\par

If either of the first two of these rationales is in fact animating the legislature, behavioral biology could be relevant. First, behavioral biology makes some sense of statistics, typically misunderstood or ignored, indicating that females outside reproductive ages are in fact far less likely to be targeted for sexual assault. n311 Second, behavioral biology predicts, and at least one study has found, that women outside the reproductive ages, while '5B*917'5D cl early traumatized, are traumatized less by rape, on average, than are women inside their reproductive years. n312 Obviously, the relevance, if any, of behavioral biology depends on precisely what values a legislature is attempting to vindicate. But these are examples of values as to which effective legal policy could

ld be informed by behavioral biology. For if the study of behavioral biology leads us to data that are in fact consistent with biobehavioral theory but inconsistent with the assumptions upon which different sentencing schedules rest, then we may wish either to change the schedules or rest them on alternative grounds.

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n311. See supra notes 126-132 and accompanying text.
n312. See supra notes 137-142 and accompanying text.

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B. Contextualizing Trauma: Views of Women and Rape

It has never been quite clear whether the message for today's men is that they should muster more sympathy or empathy for rape victims. Sympathy risks an objectifying paternalism, because its very essence underscores the distinction between the observed and the observing. Empathy risks the potentially absurd - the spectacle of a man claiming to truly understand, to feel, or to know precisely what it feels like to be a raped woman. One's assessment that sympathetic or empathetic responses are more appropriate likely varies, in part, with the extent to which one believes that male and female psychologies are the same, and that therefore there can be an ungendered 'reasonable person' reaction to rape.

From the perspective of behavioral biology, however, rape is sui generis. Male and female brains are overwhelmingly likely to process rape victimization differently, even though they are likely to process similarly in the vast majority of other contexts. A biobehavioral perspective, were it to become more widely understood and appreciated, could have both positive and negative implications for our legal system.

The positive implications are at least three. First, and most generally, contextualizing the fear of rape and the psychological pain of having been raped within the long evolutionary history of the female brain could lead to more sympathetic support for antirape initiatives, prosecutorial efforts, and victim services. That is, understanding the historical and evolutionary significance of female mate choice, the gross disparities between males and females in the costs of enforced parenthood, and the extent to which well-understood evolutionary processes would tend to yield distinct emotional responses to behavior that threatened female mate choice in ancestral environments, would help underscore the very special nature of rape. It would also help explain why women are more likely than men to harbor a deep, visceral revulsion to rape and threats of rape. In short, it helps to make rape a big deal.

To the extent that men previously have been encouraged to believe that there are no truly significant biobehavioral and psychological differences between men and women, sympathetic understanding of rape has likely suffered. Male legislators, judges, and prosecutors encouraged to discount or disbelieve the existence of male-female differences may mentally substitute themselves for a rape victim when assessing the reasonableness of her fear of rape or her response to it. They may imagine their own response to rape or threat of rape and, since they typically will not experience the same fear of or trauma due to rape that behavioral biology predicts an average woman might, they may therefore tend to discount the significance of rape to the average female. The behavioral biology perspective buttresses greater understanding of rape responses

es by providing explanatory context for the belief that reasonable women and reasonable men will likely react differently to rape. To the extent that rape victims perceive increased legal responsiveness to rape trauma, rape reporting may increase.

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313. Professor Denno makes a similar point in Denno, supra note 273.

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Second, and more specifically, contextualizing women's emotional reactions to rape within the evolutionary processes that increased the probability of those reactions could improve the rational progress and effectiveness of rape trials. Presently, outcomes of rape trials often turn on the struggle to introduce or exclude evidence of "rape trauma syndrome" (RTS). This label was created to medicalize and categorize rape reactions within the larger arena of post-traumatic stress disorders. Prosecutors, for example, attempt to introduce RTS evidence to justify behavior brought into question by the defense, such as a delay in reporting the rape, behavior seemingly inconsistent with being a crime victim, and the like. 314 Defendants occasionally attempt to introduce RTS evidence to undermine the alleged victim's credibility, on the theory that if she did not exhibit RTS then it is unlikely that she was in fact raped. 315

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314. See, e.g., *People v. Taylor*, 552 N.E.2d 131 (N.Y. 1990) (holding that prosecutors could introduce RTS evidence to explain victim's initial unwillingness to identify her attacker).

315. See, e.g., *Henson v. State*, 535 N.E.2d 1189 (Ind. 1989) (holding that exclusion of expert testimony that complainant's behavior after alleged rape was inconsistent with RTS is reversible error); see also Nicole Rosenberg Economou, Note, Defense Expert Testimony on Rape Trauma Syndrome: Implications for the Stoic Victim, 42 *Hastings L.J.* 1143 (1991).

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As courts attempt to parse the scientific acceptability of such syndrome evidence, they frequently have been encouraged by the medical profession and trial attorneys to view RTS as some sort of pathological illness and dysfunction, 316 rather than an often understandable outgrowth of evolved female psychological mechanisms that tended in ancestral environments to improve a woman's chances for meaningful and adaptive mate choice by associating the lack of such choice with particularly acute psychological distress. Doing so may unfairly burden the state or plaintiff, demanding explanation and evidence in support of what may be a fundamental psychological feature shared widely by females of our species and many others. Moreover, it risks stigmatizing the victim (as a woman with a "syndrome") in a fashion that overblows its significance, and potentially deters rape victims from reporting rapes, cooperating fully with prosecutorial efforts, or pursuing civil remedies available to them. The behavioral biology perspective could afford a rational and intellectually accessible foundation for judge, jury, and society to accept a female victim's emotional reactions in an un-syndromed, non-aberrational, non-medicalized context.

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n316. See Stefan, *supra* note 261. \par
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Third, postulating evolved differences in the male and female perceptions of rape and threats of rape could inject some useful humility into cross-sex legal pronouncements about what rape means and just how pernicious it is. In *Coker v. Georgia*, n317 for example, an all male Supreme Court concluded that the death penalty was a constitutionally impermissible punishment for raping an adult woman. n318 To so hold, consistent with its prior capital punishment decisions, the Court needed to conclude that death for rape was "excessive" - a standard satisfied by, among other things, punishments that are "grossly out of proportion to the severity of the crime." n319 This case must be understood, of course, against the backdrop of racially biased capital punishment. But it strikes me as not insignificant that the Court bolstered its conclusion as follows:

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n317. 433 U.S. 584 (1977). \par\par
n318. The Georgia Code at the time specified that "a person convicted of rape shall be punished by death or by imprisonment for life, or by imprisonment for not less than one nor more than 20 years." *Id.* at 586 (citing Ga. Code Ann. 26-2001 (1972)). Upon conviction, punishment was determined by a separate sentencing proceeding in which, to impose the death penalty, a jury had to find at least one of the statutory aggravating circumstances. See *id.* at 586, 587 n.3 (citing Ga. Code Ann. 26-3102 (1977)). Coker claimed that being executed for his most recent rape conviction would violate his constitutional right under the Eighth Amendment to be free from cruel and unusual punishment. Seven Justices agreed. (Two of them, Justices Brennan and Marshall, believed the death penalty to be unconstitutional in all cases, necessarily including this one.) The plurality opinion of Justices White, Stewart, Blackmun, and Stevens held the death penalty for raping an adult woman unconstitutional in all such cases not also involving murder. Justice Powell, concurring in part, would have held the death penalty for raping an adult woman unconstitutional except for "aggravated" rapes, such as those involving excessive brutality.

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n319. The Court had recently and firmly reiterated, in *Gregg v. Georgia*, 428 U.S. 153 (1976), that the Eighth Amendment bars not only barbarous punishments, but also punishments that are excessive in relation to the severity of the crime. The Court also held in *Gregg* that the death penalty was not a categorically unconstitutional form of punishment. \par

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Rape is without doubt deserving of serious punishment; but in terms of moral depravity and of the injury to the person and to the public, it does not compare with murder. Rape does not include even the serious injur

y to another person<Elip> We have \5B*920\5D the abiding conviction that the death penalty <elip> is an excessive penalty for the rapist <Elip> n320\par

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Leaving aside this statement's furtherance of discussion of the death penalty, the point I raise here is that this reasoning relies on a judicially asserted fact regarding the magnitude of the harm of rape and the comparative harmfulness of being raped instead of killed. The claim is purportedly objective, it employs a \22reasonable person\22 assessment of rape's harm, and it is likely replicated elsewhere in the legal system. Perhaps the Justices were right, in the end. But I am not presently convinced that men in the legal system should be quite so sanguine about their ability to make such assessments of female psychology in the context of rape. For everything we know about the biology of behavior suggests that male and female brains will tend to process and react to rape differently - and not solely because of the different ways in which they have been socialized. Consequently, a behavioral biology perspective on the psychology of rape's harms may prompt us to reevaluate the bases on which we compare it to other harms.\par

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n320. \i Coker, 433 U.S. at 598\i0 (emphasis added). Interestingly, the court limited its decision to rapes of adult females, leaving open whether it would be unconstitutional to impose the death penalty for the rape of a child. So noting, the Louisiana Supreme Court, in \i State v. Wilson, 685 So. 2d 1063 (La. 1996)\i0 cert. denied sub nom., \i Bethley v. Louisiana, 117 S. Ct. 2425 (1997)\i0 upheld the constitutionality of a statute allowing capital punishment for the rape of a child under the age of twelve. \par

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On the other hand, contextualizing the harm of rape within differently evolved male and female psychologies could yield potentially unjustifiable ripple effects of acknowledging male and female differences generally. If people were to view female psychology as particularly vulnerable in the context of rape, it might serve to justify otherwise unwarranted discrimination in hiring contexts regarding jobs that may expose women to rape-risky environments. More generally, people uninformed about the kinds of circumstances in which male and female psychologies may differ could extrapolate the existence of sex differences in the rape contexts into other contexts less supported or unsupported by the underlying behavioral biology. For example, some people might argue that evolved sex differences were broadly generalizable, rather than narrowly context-specific, and attempt to use such a misarticulation and misapplication of biobehavioral science in furtherance of even broader discrimination on the basis of sex. \par\par

Whether the potential benefits or harms of contextualizing trauma will be greater will depend, in part, on the extent to which policy makers understand that the existence of differences between the sexes is not only extremely likely to be evident in the context of rape (and other behaviors closest in nexus to the reproductive success of our ancestors), but also extremely unlikely in a great many other contexts. \par\par

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C. Rape Motivation: The Violence Against Women Act of 1994\par
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One area in which biobehavioral theories of sexual aggression may have clear application is in contexts in which the motives for rape themselves have direct legal significance. The Violence Against Women Act of 1994 (VAWA),³²¹ for example, in a famously controversial provision, affords civil rights remedies to victims of "crimes of violence motivated by gender."³²² To prove that criminal violence upon her was "motivated by gender," a woman must demonstrate by a preponderance of the evidence that the attack upon her was: (a) "committed because of gender or on the basis of gender"; and (b) "due, at least in part, to an animus based on the victim's gender."³²³ Should she succeed, she may be awarded "compensatory and punitive damages, injunctive and declaratory relief, and such other relief as a court may deem appropriate."³²⁴ However well-intentioned the legislation, biobehavioral perspectives may call into question the wisdom of its precise wording, design, and application.³²⁵ There are several issues regarding the Act: the scientific accuracy of the general understanding of human motivation that it reflects; the specific theories of rape it reflects; and its likely effectiveness.

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³²¹. Pub. L. No. 103-322, 40111(a)-40611, 108 Stat. 1796, 1993-53 (codified as amended in scattered sections of 8, 18, 28, and 42 U.S.C.). \par\par

³²². 42 U.S.C. 13981(i)(a) (1994). For examples of other contexts in which motive for rape may be relevant, see Baker, *supra* note 16. \par\par

³²³. 42 U.S.C. 13981(i)(d), (e)(1) (1994). \par\par

³²⁴. 42 U.S.C. 13981(i) \par\par

³²⁵. For a view that evolutionary theory supports the argument that bias crime statutes should encompass gender-related crimes, see Katherine Chen, Note, Including Gender in Bias Crime Statutes: Feminist and Evolutionary Perspectives, 3 Wm. & Mary J. Women & L. 277 (1997). \par

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The extent to which motive is relevant to the law's punishment of bad acts, or compensation for injurious ones, is a matter as to which theorists have devoted much ink. Typically, motive is probative of the likelihood that a defendant committed an act with which he is charged, as in the context of an allegedly premeditated murder, or motive is independently relevant at sentencing. But it is quite rare to make a specific kind of motive a separately necessary element of an action. When the legal system ventures to make motive a formal element of an action, as it has in VAWA, two results may ensue. First, the threshold for demonstrating motive may be sufficiently high, as a practical matter, that few plaintiffs will succeed. This could be the case, for example, if the courts considered the matter of motive so complex that the plaintiff's burden would be quite heavy. Alternatively, since judges may properly presume that Congress had cases in mind to which a statute costly to create would apply, the threshold for proving motive may de facto become lower than a scientific reality (at least) may suggest. This would make it relatively simple to offer persuasive evidence of motive; else none would be persuasive at all. \par\par

^{325B*922} In a number of important cases, the latter path appears to have been taken. For example, one federal district court opined that cases in which rape would not have been "motivated by gender," with constituent animus, would appear to be few and far between.³²⁶ Another district court, in the context of an unwanted fondling the court found to be animus-motivated, applied a standard for animus so low that all rapes would seem to quali

fy. n327 That court reasoned that\par

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n326. \i Anisimov v. Lake, 982 F. Supp. 531, 541 (N.D. Ill. 1997).\i0 \par

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n327. See \i Doe v. Hartz, 970 F. Supp 1375 (N.D. Iowa 1997),\i0 rev'd on o
ther grounds, \i 134 F.3d 1339 (8th Cir. 1998).\i0 Specifically, the defendant
'22came up behind '5Bthe plaintiff'5D, grabbed her with both of his hands a
nd pulled her back into his body, held her tightly and kissed her neck.'22 \i
Doe, 970 F. Supp. at 1381.\i0 Later that evening, he '22rubbed Plaintiff's ba
ck up and down with his hand.'22 Id. \par

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because unwanted or unwelcome sexual advances may be demeaning and belittling,
and may reasonably be inferred to be intended to have that purpose or to releg
ate another to an inferior status, even if the advances were also intended to s
atisfy the actor's sexual desires, the allegations of the '22animus'22 elemen
t are here sufficient. n328\par

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These judicial developments implicitly reflect judicial notice of the claim th
at sexual aggression cannot be sexually motivated without animus as if it were
indeed fact that sexual aggression cannot be sexually motivated without animus.

The momentum of this questionable view is reflected in subtitle D of VAWA, ent
itled The Equal Justice for Women in the Courts Act of 1994. n329 Notwithstandi
ng that it immediately follows subtitle C, which creates the civil rights cause
of action for violence against women '22motivated by gender,'22 and notwiths
tanding that the legislative history of subtitle C makes quite plain that court
s were not to assume that every rape is '22motivated by gender,'22 subtitle D
reflects the assumption that rapes are motivated by gender. Specifically, subt
itle D authorizes grants for training judges and court personnel '22in the law
s of the States <elip> on rape <elip> and other crimes of violence motivated by
the victim's gender.'22 n330 The momentum of this empirically questionable as
sumption that rapes almost always involve gender animus is also reflected in at
least two categories of legal scholarship. One calls for a rebuttable presump
tion of animus in rape cases because '22gender animus is an underlying factor i
n almost all rapes.'22 n331 The other argues that VAWA should be '5B*923'5
D amended to strike the animus requirement altogether, to make rape per se ac
tionable under VAWA. n332\par

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n328. \i Doe, 970 F. Supp. at 1408.\i0 \par\par

n329. Pub. L. No. 103-322, 40401-40422, 108 Stat. 1796, 1942-45 (codified as
\i 42 U.S.C. 13701,\i0 13991-14002 (1994)). \par\par

n330. \i 42 U.S.C. 13991\i0 (1994) (emphasis added); see also \i 42 U.S.C.
13992\i0 (19) (expanding concern to '22gender-motivated crimes of violence oth
er than rape'22). \par\par

n331. Gaffney, supra note 26, at 264. \par\par

n332. See Frazee, supra note 22, at 242-43, 245-47; see also Goldfarb, supra
note 26, at 398-99 (citing authors who would prefer that the legislation presu

me that rape is always gender-motivated).

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Certainly, much male-female violence, like much violence generally, is motivated by an amalgam of anger and at least momentary hatred. And the legislative history of VAWA provides some guidance as to circumstances, such as the presence of sexist epithets during the violence, that make meeting the animus requirement fairly unambiguous to apply. But when the violence in a VAWA action is rape (rather than the host of other assaults that can qualify as crimes of violence motivated by gender) the empirical - and hence ultimately scientific - question of motivation is likely to be more complex than generally assumed.

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n333. An obvious and extreme example is the 1989 shooting attack, in Montreal, on 27 women. The gunman's suicide note indicated that he blamed women generally, and feminists in particular, for his problems. See David E. Pitt, Montreal Gunman Had Suicide Note, N.Y. Times, Dec. 8, 1989, at A9.

n334. See, e.g., S. Rep. No. 103-138, at 51 (1993).

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This complexity obtains for two reasons. First, the entire legal construct of motivation is biologically naive, in ways that render its use in the rape context problematic. This is true even if one acknowledges, as the legal system clearly has, that people can have multiple motives for their acts. By failing to recognize the distinction between, and yet inescapable interconnectedness of, proximate (immediate) and ultimate (evolutionary) levels of causation, law treats motive simplistically, as if motives come in easily disentangled and categorized kinds, which compete in a zero-sum game for relative proportional influence.

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n335. See, e.g., Price Waterhouse v. Hopkins, 490 U.S. 228 (1989) (describing standards for finding Title VII violations in mixed-motive cases).

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Leaving the biobehavioral theories of rape aside for the moment, biology makes compellingly clear that sexual behaviors must be understood as the product of proximate and ultimate causes. They have proximate origins (such as observation of a potential sex partner) as well as evolutionary origins (such as the non random patterning of psychological desires for sex partners exhibiting certain kinds of characteristics). Thus biobehavioral causes of sex behavior, even sexual aggression, can exist at the same time that other contributors, such as political powerlessness of victims, do. These multiple causes coexist in the same way that an infinite variety of blueprinted boxes could all have a constant height, even while their lengths and widths permuted wildly.

The second reason the question of rape motivation is likely to be more complicated than commonly presumed is based on the biobehavioral evidence discussed

earlier. There is simply a great deal of evidence, consistent with narrow, falsifiable, and parsimonious predictions, derived from robust foundations of behavioral biology, suggesting that rape is frequently influenced, at least in part, by nonrandom, context-specific, information-processing predispositions typical to the male brain of many species, including humans. This evidence neither excuses rape when it does occur, nor makes rape determined or inevitable. But it may very well mean that the popular hypothesis that most rape is a product of misogynistic animus, quite similar to that present in lynchings, is overcredited.

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n336. It is a remarkably popular belief of many legal commentators that rape is to women as lynching is to African Americans - an act motivated by hatred. See, e.g., W.H. Hallock, *The Violence Against Women Act: Civil Rights for Sexual Assault Victims*, 68 Ind. L.J. 577, 609-10 (1993) (making lynching analogy).

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In the end, the biobehavioral perspectives on sexual aggression may suggest that VAWA is unlikely to be as effective a remedial and deterrent mechanism as its proponents hoped. VAWA uses a civil rights framework largely borrowed from hate-crime legislation targeting racially motivated violence. It thus reflects the assumption that male violence against women is quite often the same sort of thing - a hate crime - as racial violence (or at least that a legal framework intended primarily to deter white violence against blacks will be equally effective in deterring male violence against women). n337 While it is possible that a statutory mechanism designed to deter and fairly compensate for violent hate crimes may be equally effective in the context of sexual violence, biobehavioral theories suggest that view may be overly optimistic. The evolved psychology of sexuality and sexual desire, reflecting roughly 600 million years of sexual dimorphism in our lineage, likely renders the psychology of sexual violence a very different thing than the psychology of racial violence. n338 Thus the effectiveness of VAWA may be undercut by its very cross-conceptualization of race and sex. n340

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n337. See, e.g., S. Rep. No. 103-138, at 49 (1993); see also Peggy Miller & Nancy Biele, *Twenty Years Later: The Unfinished Revolution*, in *Transforming A Rape Culture* 47, 52 (Emilie Buchwald et al. eds., 1993) ('Rape is a hate crime, the logical outcome of an ancient social bias against women.').

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n338. The Senate Report accompanying VAWA stated that 'it is time for attacks motivated by gender bias to be considered as serious as crimes motivated by religious, racial, or political bias. The provision's purpose is to provide an effective anti-discrimination remedy for violently expressed gender prejudice.' S. Rep. No. 103-138, at 38 (1993). See also id. at 42 ('VAWA is designed to remedy not only the violent effects of the problem, but the subtle prejudices that lurk behind it.'). id. at 48-51 (suggesting that VAWA is not intended to make all violent crimes against women, or even all rapes of women, civilly actionable). Earlier versions of VAWA indeed defined all rapes as crimes motivated by gender. See, e.g., S. Rep. No. 101-545, at 23 (1

990). Lastly, the legislative history frequently uses racial context examples to illustrate gender context points. See *id.* at 50, 52. \par\par

n339. Many biologists question the very concept of 'race' in the human species, considering it a social, not a biological, term applied loosely to historically localized breeding populations that can, nonetheless, interbreed when brought together. To the extent that races do exist, they can only have existed for about 35,000 years, which is likely too short a time for any significant race-specific psychological differences or adaptations to have arisen. See, e.g., L. Luca Cavalli-Sforza et al., *The History and Geography of Human Genes* 16-20 (1994). For further discussion, see Jonathan Marks, *Human Biodiversity* (1995); Jonathan Marks, *Science and Race*, 40 *Am. Behavioral Scientist* 123 (1996); and Lionel Tiger, *Trump the Race Card*, *Wall St. J.*, Feb. 23, 1996, at A12. \par\par

n340. The potential contributions of behavioral biology in this context relate only to the accuracy of empirical assumptions legislators and courts may bring to the implementation of subtitle C of VAWA. In no way do they suggest that the meritorious goal of reducing rape that underlies Title III should not be pursued in other ways. \par

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D. Rape Classification in State Criminal Statutes\par

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On the theory that rape may be a crime of violence, not of sex (again, *The Error of the False Dichotomy*) n341 most states have formally reclassified rapes using terms other than 'rape.' n342 Colorado, for example, redefined rapes as 'sexual assaults.' n343 While a number of states, Colorado among them, retain a section on sexual assaults distinct from assaults generally, it is nonetheless clear that the taxonomic reclassification was intended to make 'rape' and 'assault' much closer conceptual cousins. Some authors have advocated that all former rape law be merged into state statutes' general assault regimes. n344 In either case, particularly the latter, reclassifying rape has consequences, many of them quite laudable. It sends a strong symbolic message that rape is intolerable. It makes clear that rape is not a sexual experience for the victim. And it signals that rape is not the kind of behavior likely to be treated leniently.\par

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n341. See *supra* notes 157-171 and accompanying text. \par\par

n342. See Bryden, *supra* note 5 (manuscript at Part V & n.335, on file with author). \par\par

n343. See, e.g., *Colo. Rev. Stat. Ann.* 18-3-402 (West 1990 & Supp. 1998). \par\par

n344. See Bryden, *supra* note 5 (manuscript Part V, on file with author) (describing this approach and citing, as an example, Martin D. Schwartz & Todd R. Clear, *Toward a New Law on Rape*, 26 *Crime & Delinq.* 129, 136-37 (1980)). Bryden is sharply critical of this suggestion. \par

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It is unclear, however, whether invoking a legal regime that has penalties designed to confront and deter other crimes of violence will be effective in deterring this kind of violence. The reclassification, therefore, may prove unwise

. If the biobehavioral theories about evolutionary influences on patterns of rape are accurate, rape behavior is likely to respond to environmental changes - and the threat of legal penalties - in a very different way than, say, violence incidental to either thefts of property or anger over a confrontation. For example, psychological processing mechanisms relevant to many rapes may be less sensitive to post-act costs not typically encountered in the environment of evolutionary adaptation. This may, in fact, suggest that rape should be subjected to a separate schedule of punishments, much harsher than ordinary (and harsher than ordinary assaults carry), to counter behavior that may be somewhat less rationally calculated than ordinary. Reclassifying rape as a subset of other assaults may make this separate punishment scheme more difficult to maintain and defend, because the greater the perceived similarity in the crimes, the more one expects similarity in penalties. \par\par

\5B*926\5D It is always relevant to legal reform to estimate the relative difficulties with which different behaviors can be changed. To date, reformers have had few tools available to aid their estimates. Often, legal thinkers rely on a combination of intuition, observation, and trial and error. In certain arenas, such as market operations and tax policy, economic tools have helped law to anticipate and thus to shape legal policies predictably effective at encouraging or discouraging activities. But economics has its limits, because humans are notoriously prone to emotional and irrational behavior. n345\par

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n345. For brief discussion of this point, and the utility of evolutionary psychology in understanding human emotions, see Owen D. Jones, Law, Emotions, and Behavioral Biology, 39 Jurimetrics J. 283 (1999). \par

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What behavioral biology offers is a systematic way of estimating, by behavior, what lawmakers are up against. Understanding how natural selection has shaped the human brain provides a reliable way of estimating the relative degree of legal intervention necessary to shift different law-relevant behaviors. Quite simply, when the law encourages behavior to which the human brain is already predisposed, it will be more easily successful than when it attempts the opposite. The degree of difficulty it encounters, in the latter context, will correspond to the magnitude of the effect that behavior had on the reproductive success of pre-human and early human ancestors in long-faceted environmental conditions. \par\par

This difficulty does not mean that rape is inevitable. It does mean, however, that if the selection theories of biobehavioral influences on rape are true, then rape behavior will be even more difficult to eradicate than some theorists estimate. n346 With the exceptions of survival and sexual maturity, copulation with fertile females has long been the principal prerequisite behavior for male reproductive success. Resource acquisition, status, competition for mates, child-rearing, and the like all help. But the human brain can be expected, on average, to yield increasingly intense emotional states, predisposing its bearers to increasingly desperate, even forceful \5B*927\5D action, as prospects of even minimum reproductive success fail to materialize, or otherwise diminish. Many aspects of our culture are designed to inhibit the expression of such predispositions. But we should anticipate and counter environmental stimuli that may disinhibit these predispositions, however major or minor they may be.\par

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n346. Compare, for example, this passage, \par\par

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The eradication of rape is contingent on educating and sensitizing our society to the meaning of the crime and the context in which it occurs<Elip> Ultimately, however, the elimination of rape will require a massive reconsideration and restructuring of social values as well as a reorientation of the relations between the sexes. It is the thesis of this author that when the sex roles of both men and women are defined by individual needs and talents rather than by stereotypic expectations based on sex and power motives, only then will there be an end to rape.\par

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Hilberman, *supra* note 41, at 62. See also Patricia Searles & Ronald J. Berger, Conclusion to Rape & Society, *supra* note 30, who call for \par\par

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radical social structural and cultural change <elip> \5Bby\5D redesigning our sex-education programs so as not to continue to \22rear our sons and daughters in such ignorance of their sexuality that many confuse pleasure with pain and domination\5B;\5D <elip> confronting rape-supportive beliefs and attitudes \5B;\5D <elip> challenging traditional notions of masculinity and femininity\5B;\5D <elip> advocating and creating social and economic reforms designed to promote gender equality and improve the overall condition of women in society \5Band\5D <elip> addressing the socioeconomic causes of crime and seeking to reduce unemployment, poverty, and racial discrimination.\par

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Id. at 266-67. \par

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Proposed changes in education, socialization, and culture are useful and necessary. n347 But behavior can in no legitimate way be thought to arise from culture alone, whether the particular selection theories of rape are or are not true. The human brain is a specialized information processor - whose patterns of psychological states will tend, on average, to inspire behavior that was adaptive in the environments of evolutionary adaptation. This is cause for attention, not alarm. If we want to reduce the incidence of rape, the better we understand the way brains process environmental conditions in ways that increase or decrease the likelihood of rape the better we can deter it. n348\par

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n347. See, e.g., Stock, *supra* note 181, at 73 (\22I hope that males can be reeducated and resocialized so that they no longer define as in their interests the maintenance of a position of control over women, particularly using sexual coercion as a means of enforcement.\22). \par\par

n348. Professor Donald A. Dripps observes that the causes of rape are largely \22irrelevant.\22 See Dripps, *supra* note 4, at 1781 n.3. He states, \22Whether conduct originates from social or biological causes, its incidence will be reduced by the law's physical threat and moral condemnation. The question law must answer is what conduct to punish and condemn.\22 *Id.* I suggest that the l

aw should also have systematic processes for choosing how to deter, or how to deter more effectively. Evolutionary psychology is relevant to those processes.

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E. Cost-Benefit Analyses: Hidden Policy Tensions Exposed\par
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One of the principal and most useful applications of evolutionary analysis is its ability to improve cost-benefit estimates.ⁿ³⁴⁹ It aids this process in two ways. First, because it can reveal interconnectedness between different behaviors, it can be a powerful tool for exposing hidden conflicts between seemingly unrelated goals. Second, it increases the comprehensiveness of each cost-benefit calculus by providing some sense of the actual costs of the conflicts.\par

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ⁿ³⁴⁹. See Jones, *Evolutionary Analysis in Law*, *supra* note 11, at 1236-40. \par
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For example, evolutionary analysis reveals potential tensions between anti-prostitution policies and anti-rape policies. If we assume that there are biobehavioral influences on the patterns of rape, then the relative availability of willing sex partners for men likely has some influence on the rape rate. (Remember that sexual desire is a proximate mechanism in furtherance of evolutionarily adaptive behavior, and that a conscious desire to reproduce with a given prostitute is unnecessary for the urge to visit a prostitute to be understood as evolutionarily influenced.) Prostitution makes a sex partner available to almost any man of even the most modest means. Consequently, it follows that an aggressive policy against prostitution may compromise an aggressive policy against rape. Although evolutionary analysis can say nothing about whether reducing the incidence of rape or prostitution is the more important social goal, it can highlight that the effective pursuit of one may come at some cost to full success in pursuing the other.ⁿ³⁵⁰ Specifically, criminalizing prostitution in ways that effectively decrease its incidence may result in a slightly higher rape rate than may otherwise have obtained.ⁿ³⁵¹\par
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ⁿ³⁵⁰. For a brief but useful discussion of some of the many possible costs of over- and undercommodifying sexual services, see Margaret Jane Radin, *Market-Inalienability*, 100 Harv. L. Rev. 1849, 1856, 1921-25 (1987).\i0 \par\par

ⁿ³⁵¹. I am presently unaware of any indication that this idea has been seriously considered by legal policy makers, at least in the United States. One influential researcher dismissed the idea, in a section subtitled "Myths About the Remedy," with the following reasoning: "The fact of the matter is that prostitution does exist and it offers no solution since, again, the offender is not seeking primarily sexual gratification." Groth, *supra* note 33, at 8. This reasoning is unpersuasive. That prostitution exists and does not eliminate rape affords little confidence to the conclusion that increasing the availability of prostitution would not decrease the rate of rape. \par

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There is remarkably little information available that would enable us to test the hypothesis that the prostitute supply and the rape rate are inversely correlated. n352 For one thing, it is difficult to make reliable judgments about the number of prostitutes on the basis of prostitution's illegality alone. Jurisdictions vary widely in the extent to which prostitution is actively discouraged. For another, it is possible that males may be less inhibited from raping prostitutes than non-prostitutes, since where prostitution is illegal a prostitute may be far less likely than non-prostitutes to report her victimization. There are simply too many variables, economic, political, demographic, and the like, for a comparative study to easily control.\par

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n352. One would think, for example, that before and after data on rape and prostitution in Nevada or the Netherlands, where prostitution is legal but limited, would be easily accessible. However, I have been unable, thus far, to locate any sources that would enable straightforward analysis. \par

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Nonetheless, there is some evidence from Australia that supports this hypothesis. In a longitudinal study, Barber found that the conviction rate for rape and attempted rape in the seven-year period following the closure of brothels in the territory of Queensland was triple the rate for the seven-year period prior to the closures. n353 The socio-economic and demographic characteristics of those convicted correlated positively with those of the men who had most frequented brothels during more permissive times. n354 Moreover, the increase was three times the rate of increase for convictions of other violent crimes. n355 This is not dispositive, of course, because the prosecutorial policy and personnel were not constant across the fourteen-year period, but it is probatively probative.\par

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n353. See R.N. Barber, Prostitution and the Increasing Number of Convictions for Rape in Queensland, 2 Austl. & N.Z. J. Criminology 169, 171 (1969). Brothels, though technically illegal, had been tolerated until a large-scale crackdown in 1959. See id. \par\par

n354. See id. at 172. \par\par

n355. See Tedeschi & Felson, supra note 116, at 315 (discussing Barber study). Barber concluded that the data show clearly that there was a remarkable increase in the conviction rate for rape and attempted rape after this closing - an increase that was not found in convictions for offences against the person by males in general. Barber, supra note 353, at 171-72. This is, of course, only correlational evidence, but it is among the only pieces of evidence currently available. \par

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Surely not all rape would disappear if prostitution were legal and accessible. And the potential rape of prostitutes is no less a concern than the potential

l rape of non-prostitutes. n356 But to the extent that patterns of rape reflect male psychological predispositions toward sexual behavior generally, prostitution rates and rape rates may trade against each other. Although those who support decriminalization of prostitution have not commonly argued this, n357 biobehavioral theory suggests that legalizing prostitution might therefore cause the overall rape rate to decline. Consequently, a legislature that valued reduced rape more than reduced prostitution might experiment with legalizing prostitution.

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n356. See Jody Miller & Martin D. Schwartz, Rape Myths and Violence Against Street Prostitutes, 16 Deviant Behav. 1 (1995) (persuasively arguing against the myth that prostitutes are unrapeable).

n357. See, e.g., Tracy M. Clements, Prostitution and the American Health Care System: Denying Access to a Group of Women in Need, 11 Berkeley Women's L.J. 49 (1996); Michael Conant, Federalism, the Mann Act, and the Imperative to Decriminalize Prostitution, 5 Cornell J.L. & Pub. Pol'y 99 (1996); Lars O. Ericsson, Charges Against Prostitution: An Attempt at a Philosophical Assessment, 90 Ethics 335 (1980); Minouche Kandel, Whores In Court: Judicial Processing of Prostitutes in the Boston Municipal Court in 1990, 4 Yale J.L. & Feminism 329 (1992); Jessica N. Drexler, Comment, Governments' Role in Turning Tricks: The World's Oldest Profession in the Netherlands and the United States, 15 Dick. J. Int'l L. 201 (1996).

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F. Statistical Evidence of Harm at Civil Rape Trials

That rape is emotionally and often physically damaging is generally uncontroversial. But the relatively novel civil actions for rape create new issues certain to be controversial. For example, the civil rights cause of action created by VAWA (over which the federal and state courts have concurrent jurisdiction) n358 grants some rape victims the right to sue their attacker for civil remedies, typically monetary damages. n359 This may ultimately enable a victim-plaintiff seeking damages beyond those incurred in medical and psychiatric contexts (for example) to proffer evidence quantifying the emotional harm of being raped. She may wish: (a) to testify as to the extent of her emotional harm; (b) to introduce statistical evidence suggesting the degree of emotional harm experienced by typical rape victims; or (c) both.

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n358. See 42 U.S.C. 13981(e)(3) (1994).

n359. See 42 U.S.C. 13981(c) (1994):

Cause of action A person <elip> who commits a crime of violence motivated by gender and thus deprives another of the right declared in subsection (b) <elip> shall be liable to the party injured, in an action for the recovery of compensatory and punitive damages, injunctive and declaratory relief, and such other relief as a court may deem appropriate.

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The reason biobehavioral theories may become relevant in this context is that there now exists some evidence to suggest, consistent with the predictions of biobehavioral theories, that victim trauma, while generally substantial, tends to vary among victims in predictable ways. Differences in demographic factors, such as victim age, and situational correlates, such as the kind of sexual assault, tend to affect the magnitude of victim trauma. It is consequently possible that some parties may seek to introduce such statistical evidence at trial in support of establishing or diminishing damage awards.

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n360. See supra notes 137-145 and accompanying text.

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It is unclear to me whether, if this happens, it will be a constructive development. But it is clear that the biobehavioral perspective affords neither plaintiff nor defendant automatic advantage in this civil trial context. In cases of penile-vaginal rapes of females of reproductive age, for example, plaintiffs may seek to introduce statistical evidence that this combination of variables has by far the greatest average likelihood of prompting extreme distress, and therefore of justifying the highest damage awards. In cases involving non-penile-vaginal sexual assault or victims outside their reproductive years, defendants may seek to introduce statistical evidence, informed by biobehavioral theory, that the average similarly situated victim tends to be somewhat less harmed than one might otherwise assume.

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n361. See supra notes 143-145 and accompanying text.

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At least two aspects of these potential scenarios warrant reflection. First, even if the biobehavioral theories of victim trauma are indeed robust, it is not necessarily the case that the theories themselves must be introduced to lay the foundation for independently relevant statistics, such as those showing variation in victim trauma. Credibly gathered statistics can be evaluated on the same general bases that statistics generally are. On the other hand, the patterns evident in the statistics may be sufficiently counter-intuitive that a firm grounding in evolutionary biology is necessary to make the patterns of rape trauma both admissible and intelligible to judge and jury. Second, as Professor Steven Goldberg has pointed out, we must not lose sight of the fact that behavioral biology is generally statistical, and therefore general in nature, while the charge of the judiciary often extends into the arena of individualized justice.

Statistics about "average" female trauma may or may not be particularly helpful, and should not be considered to have sufficiently talismanic scientific qualities to warrant unreflective reliance on them.

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n362. See Steven Goldberg, *Statistics, Law, and Justice*, 39 *Jurimetrics J.* 255 (1999).

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G. The Legal History of Rape Law: A New Lens\par

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Scientists demonstrate that the human brain is an evolved, special purpose information processor. Natural selection has left it designed to correlate patterns of environmental stimuli with patterns of subjectively perceived emotional states, which tend in turn to increase the likelihood of behavior that was historically adaptive, in the environment of evolutionary adaptation. Separately, legal historians attempt to describe and make sense of past legal developments by tracing their origins and consequences. A behavioral biology perspective can bring these two enterprises together in interesting and potentially useful ways. Rape affords three windows on this conjunction. \par\par

First, behavioral biology can help explain why some of the current contours of legal systems came to be the way they are, and why some legal proscriptions were not randomly likely to arise.³⁶³ For example, despite great theoretical potential for cultural variability, forced penile-vaginal intercourse is an inflammatory and serious offense in every known society. This is true, despite the fact that there are many acts of physical violence (say, cutting off a leg) that are, on average, more physically harmful than rape. All over the planet, rape makes women fearful and angry, and it makes nonraping males who are fathers, husbands, brothers, sons, and friends of the raped female livid to the point of the most extreme forms of violence and retribution-seeking.³⁶⁴ There is no research of which I am aware to suggest that it has not always been thus. (Even the Coker Court conceded that short of homicide, rape is the ultimate violation of self.)³⁶⁵ Note too that the widest variety of legal systems, including our own, formally proscribe rape with harsh penalties. Although the complexities of the crime, the difficulties of proving lack of consent, and the vicissitudes of local attitudes have often made rape underreported, underprosecuted, and underpunished, convicted rapists still tend to be subject to unusually harsh penalties, including even death. The severity of these penalties is clear when compared to the physical harm typically inflicted, and to the less severe penalties that typically follow from even more physically severe nonsexual harms.\par

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³⁶³. The Thornhills explore such an application in Thornhill & Thornhill, *supra* note 130. \par\par

³⁶⁴. Indeed, Michael Dukakis's unemotional response to a question about the hypothetical rape of his wife, during a televised 1988 presidential campaign debate, struck people as so inhuman that his campaign manager would later say that it was at that moment she knew Dukakis would lose the election. See Susan Estrich, *The Hidden Politics of Race*, Wash. Post Mag., Apr. 23, 1989, at 20. For a discussion of evolved male psychology concerning threats by third parties to rape a mate or relative, see Thornhill & Palmer, *supra* note 14, at ch. 4. \par

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³⁶⁵. *Coker v. Georgia*, 433 U.S. 584, 597 (1977) (citation omitted); see *supra* notes 317-320 and accompanying text (discussing Coker). \par

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The extraordinarily widespread proscription against rape, coupled with the u

nusually harsh sanctions rape invokes, n366 requires explanation. Absent evolutionary analysis, a comparative legal historian would need to posit that these legal systems are commonly descended from a legal system present when all early humans lived together, have arisen in separate cultures coincidentally (like so many heads in consecutive coin tosses), or have mimicked each other through ancient, cross-cultural exposure. Each is possible and yet, on the basis of current knowledge, unlikely to afford adequate explanation.

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n366. See Tedeschi & Felson, *supra* note 116, at 334 (1994) ('22A cross-cultural survey of 110 societies from the Human Relations Area Files showed that rape is one of the three most heavily punished crimes.'22) (citation omitted).

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From the evolutionary perspective, the widespread proscription and harsh penalties were probable. They can be understood to be, in part, the product of deeply visceral male and female psychologies about reproductive matters. Natural selection likely swept away any psychological tendencies in female ancestors to be indifferent to being raped, and similarly swept away any psychological tendencies, in males and females alike, to be indifferent to daughters, sisters, and female mates being raped. The legal history of rape and the patterns of punishments that have unfolded therefore can be illuminated significantly, perhaps even largely explained, by tracing the way evolutionary processes have influenced the psychology of the human brain. n367 That is, to the extent that our human laws will tend to reflect what humans care about, evolutionary psychology will enable us to explain, in part, why certain things were deemed sufficiently important to warrant collective sanctions, and why certain things tend to be encouraged more, or punished more, than others.

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n367. Some initial thinking in this direction is suggested in Thornhill & Thornhill, *supra* note 130, at 159-63.

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Second, and reciprocally, comparative legal history may serve to identify features sufficiently common to human existence to recommend research into previously unexplored features of shared human psychology. Suppose, for example, that we did not already have biobehavioral theories of sexual aggression. The very discovery of remarkably consistent, cross-cultural patterns in legal proscriptions against rape and extreme sanctions for rape might have prompted useful theoretical and empirical work into the evolved male and female psychologies regarding rape. It is therefore possible that such comparative legal histories may serve such a function in other contexts, where common legal features of societies may serve as markers for common features of evolved human psychology.

Third, understanding the human brain as one with commonly shared, evolved, and contingent information processing patterns may provide a richer appreciation of the interplay between legal systems and human nature. n368 Legal systems can then themselves be seen as culturally manifested extensions

of evolved psychological predispositions - as an increasingly complex reflection of evolved norm-formulating behavior. For example, legal proscriptions against rape may not only reflect evolved psychological predisposition to attend to forced copulation, but may also themselves be evolved psychological mechanisms for confronting the threat of rape.

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n368. See, e.g., John O. McGinnis, *We the Primates* (forthcoming); Mark F. Grady & Michael T. McGuire, *A Theory of the Origin of Natural Law*, 8 J. Contemp. Legal Issues 87 (1997); John O. McGinnis, *The Human Constitution and Constitutive Law*, 8 J. Contemp. Legal Issues 211 (1997); John O. McGinnis, *The Once and Future Property-Based Vision of the First Amendment*, 63 U. Chi. L. Rev. 49 (1996); John O. McGinnis, *The Original Constitution and Our Origins*, 19 Harv. J.L. & Pub. Pol'y 251 (1996); see also Margaret Gruter & Paul Bohannon, *Law, Biology & Culture: The Evolution of Law* (1983); Roger D. Masters, *The Nature of Politics* (1989); *The Sense of Justice: Biological Foundations of Law* (Roger Masters & Margaret Gruter eds., 1992).

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Conclusion

Every legal regime has, as its fulcrum, a behavioral model that purports to describe causal influences on law-relevant behavior. The law can obtain no more leverage on that behavior than the solidity of that behavioral model affords. And yet for all that has been written about rape, its causes remain insufficiently understood - and popular behavioral models of rape behavior insufficiently robust - for law to prevent it effectively.

This is due, in part, to law's tendency to be a passive consumer of behavioral models offered up by others, rather than an active participant in the process of integrating the best parts of different theories that percolate separately in historically and arbitrarily divided disciplines. Having gradually abandoned the previously prevailing psychiatric, medical model of rape, which led our legislatures to write rape laws in terms of uncontrollable sexual urges, the law and legal literature have in recent years adopted, in its stead, a sociocultural and feminist understanding of rape.

This is, in many respects, an improvement. The prevalence, effects, and multiple meanings of rape have been exposed. And the legal system has been forced to acknowledge, and to begin remedying, its failures to protect women and to deter rape behavior. We have vindicated important principles of bodily autonomy, ended the marital rape exemption, erected rape shield laws, explored important dimensions of coercion that exist independent of physical force, eliminated the necessity of evidence of resistance, and ended the trivialization of rape. Nevertheless, legal reforms have had less impact than hoped. Law will likely sacrifice further improvements if it forgoes both its opportunity to encourage the eventual integration and cross-compatibility of relevant disciplinary perspectives, and the gains to legal prevention of rape this could afford. By any legitimate measure, the life science and social science perspectives on rape must in the end form a seamless web of knowledge - inconsistencies resolved, and compatibilities intertwined and reciprocally strengthened. This Article has explored why such integration may be far easier than commonly supposed, and why a model incorporating both sociocultural and biobehavioral influences on rape may be more accurate and more useful.

Given the history of popular perception of life science perspectives on sexual aggression, however, one raises them only with risks. And three have the greatest significance. The first risk is the possibility that invoking biology as having meaningful things to say about sexual aggression will be misperceived as taking issue with what others have said about the meanings and effects of rape. This risk is real, I believe, because rape scholarship to date rarely distinguishes between causes and meanings, and effects and functions. In examining modern life science perspectives on sexual aggression, however, I have explored only the causation side of the equation. One of my principal points has been that we too often have assumed, rather than seen demonstrated, that actual effects of rape are intended effects of rape, and therefore causal. We therefore have underexamined rape causation, overconfident that we understand why it happens as it does.

The second risk of exploring biobehavioral influences on patterns of sexual aggression is that doing so may seem like an effort to resuscitate the biological theories of rape that are regularly bashed. It need not seem so. Biology is not destiny. And there is no such simple thing as a rape gene, or genetic determinism, or genetic programming, or irresistible impulses, or uncontrollable urges to rape. Nevertheless, it should now be clear that the "biological" theories that are regularly and ritually bashed are not in fact theories flowing from biologists. They are something altogether different - generally the incarnation of concerns about what conclusions the public might draw from any admission that biology is relevant to rape. These are real concerns, but they are straw positions when misattributed to biologists and then cathartically demolished.

The third risk is that taking biology seriously may seem a means to some convenient normative end. There are few things scarier than the prospects of zealots claiming that biology is "on their side," justifying personal and political preferences and privilege with a patina of conveniently annexed scientific facts. But information is explanation, never justification. One therefore can not assume that the existence of biobehavioral influences on patterns of rape, and potential relevance to rape law, leads ineluctably to conservative, liberal, or any other ends whatsoever. Concluding that sexual desire is relevant to rape is not to undo the conclusion that rape is not just sex. A more moderate, and I believe more accurate, view is that there are multiple causal influences that affect who rapes whom, under what circumstances, and how rape or threat of rape affects women.

What I have argued, then, is as follows. First, the legal system improves its ability to prevent rape behavior when it increases its understanding of rape behavior. Second, understanding human behavior generally, as well as rape behavior specifically, requires a model of causation that reflects the integration of life and social sciences. Otherwise, we artificially fragment reality (at a cost to law's effectiveness) by forcing it into artificially circumscribed disciplinary compartments. And third, the life sciences, carefully studied, properly qualified, and understood on their own terms can offer us useful information about biological influences on the sexual aggression we seek to stamp out.

In science, no theory is static. Future research to test, challenge, revise, and refine biobehavioral theories is both necessary and welcome. At present, theories of biobehavioral influences on patterns of sexual aggression - viewed in context and without prejudice - are more plausible than commonly supposed, and far less deterministic than commonly caricatured. They do not contest social theories for disciplinary hegemony, but rather offer a way of seeing how critical environmental influences, such as culture and socialization a

and gender norms, are processed in a fundamentally corporeal brain, evolved to process information in nonrandom, behavior-influencing patterns. They offer a way of understanding, without justifying or excusing, the observable patterns of rape, and therefore better arm us to battle against it. \par\par

Like all theories, the biobehavioral theories here explored could be misunderstood, misapplied, or both. And against those possibilities we should be vigilant. The important gains of feminism are too long and hard fought (and perhaps even too easily dislodged) to risk on mere speculation. On the other hand, further progress in reducing rape could be as easily jeopardized, perhaps even more jeopardized, by undercrediting biobehavioral theories as by overcrediting them - despite common assumptions to the contrary. \par\par

In this Article, I have aimed to clarify what biological perspectives on rape behavior do and do not offer, where they are robust or frail, and how, where robust, they might improve our current legal approaches to what remains a troublingly frequent phenomenon. Surely rape is sufficiently repugnant to warrant seeking useful knowledge wherever it may be had. \5B*936\5D \par\par

Appendix A n369\par

Evolutionary Perspectives on Sexual Aggression: Selected Sources\par

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Randy and Nancy Thornhill are responsible for a great deal of the literature offering evolutionary perspectives on sexual aggression. See, for example, in reverse chronology, Randy Thornhill & Craig Palmer, *Why Men Rape, Why Women Suffer: Rape, Evolution, and the Social Sciences* (forthcoming 1999); Randy Thornhill, *The Biology of Human Rape*, *J. Jurimetrics* 137 (1999); Randy Thornhill, *Rape-Victim Psychological Pain Revisited*, in *Human Nature* 239 (Laura Betzig ed., 1997); Nancy Wilmsen Thornhill, *Psychological Adaptation to Sexual Coercion in Victims and Offenders*, in *Sex, Power, Conflict: Evolutionary and Feminist Perspectives* 90 (David M. Buss & Neil M. Malamuth eds., 1996); Randy Thornhill, *Is There Psychological Adaptation to Rape?*, *Analyse & Kritik* 68 (1994); Randy Thornhill & Nancy Wilmsen Thornhill, *The Study of Men's Coercive Sexuality: What Course Should it Take?*, *Behav. & Brain Sci.* 404 (1992); Randy Thornhill & Nancy Wilmsen Thornhill, *The Evolutionary Psychology of Men's Coercive Sexuality*, *Behav. & Brain Sci.* 363 (1992) (article followed by extensive peer commentary); Randy Thornhill & Nancy Wilmsen Thornhill, *Coercive Sexuality of Men: Is There Psychological Adaptation to Rape?*, in *Sexual Coercion* 91 (Elizabeth Grauerholz & Mary A. Koralewski eds., 1991); Nancy Wilmsen Thornhill & Randy Thornhill, *An Evolutionary Analysis of Psychological Pain Following Human (Homo sapiens) Rape: IV. The Effect of the Nature of the Sexual Assault*, *J. Comp. Psychol.* 243 (1991); Nancy Wilmsen Thornhill & Randy Thornhill, *An Evolutionary Analysis of Psychological Pain Following Rape: III. Effects of Force and Violence*, *Aggressive Behav.* 297 (1990); Nancy Wilmsen Thornhill & Randy Thornhill, *An Evolutionary Analysis of Psychological Pain Following Rape: II. The Effect of Stranger, Friend, and Family-Member Offenders*, *Ethology & Sociobiology* 177 (1990); Nancy Wilmsen Thornhill & Randy Thornhill, *An Evolutionary Analysis of Psychological Pain Following Rape: I. The Effects of Victim's Age and Marital Status*, *Ethology & Sociobiology* 155 (1990); Randy Thornhill & Nancy Wilmsen Thornhill, *The Evolution of Psychological Pain*, in *Sociobiology and the Social Sciences* 73 (Robert W. Bell & Nancy J. Bell eds., 1989); Randy Thornhill & Nancy W. Thornhill, *Human Rape: The Strengths of the Evolutionary Perspective*, in *Psychology and Sociobiology: Ideas, Issues and Applications* 269 (C. Crawford et al. \5B*937\5D eds., 1987); Randy Thornhill et al., *The Biology of Rape*, in *Rape* 102 (Sylvana Tomaselli & Roy Porter, eds., 1986); Randy Thornhill & Nancy Wilmsen Thornhill, *Human Rape: An Evolutionary Analysis*, *Ethology & Sociobiology* 137 (1983); Randy Thornhill, *Rape in Panorpa Scorpionflies and a Gene*

ral Rape Hypothesis, 28 *Animal Behav.* 52 (1980).

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n369. See supra text accompanying note 12.

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Appendix B

Appendix B n370

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The three other pathways (in addition to the natural and sexual selection pathway) by which patterns of rape behavior could conceivably be evolutionarily influenced are summarized below.\par

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n370. See supra text accompanying note 87. \par

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(1) Mutation-Selection Balance: The first possible hypothesis of evolutionary influence on patterns of forced copulation is best introduced by example. Suppose there was such a thing as a heritable psychological predisposition that increased the probability of aggressive sexuality (however slightly) and hence increased, in turn, the probability that those who bore it would force copulation with unwilling females. Suppose, also, that such a trait was less adaptive than an alternative, contemporaneously existing psychological trait, which predisposed the males who bore it to be more solicitous of females, and more successful in procuring mating opportunities. \par\par

In theory, even the maladaptive predisposition, which reduced the average reproductive success of its animal bearers, compared to their contemporaries, could persist in a population over time. The necessary conditions are that the mutation typically resulting in that predisposition re-arise, independently, at some low rate and that natural selection select against it each time it appears.

(Hence the term 'mutation-selection balance.') \par\par

Because mutations at a particular gene locus arise infrequently, at an average rate of one mutation per 100,000 copies of the gene, see Monroe W. Strickberger, *Evolution* 214 (2d ed. 1996), we can deduce that if a trait is both maladaptive and sustained within a population by mutation-selection balance, it would appear very infrequently. It is extremely unlikely, for example, ever to spread to one percent of a population. See Thornhill, *supra* note , at 141. As a consequence, we can also conclude that it would be unlikely that a significant proportion of other individuals within the full population would exhibit evolved counter-adaptations specific to that trait (that natural selection would have favored because they function to deflect the imposition of costs forced copulation imposes). \par\par

Two things suggest that a hypothetical, genetically influenced propensity to force copulation, in certain general kinds of circumstances, is not explicable by the mutation-selection balance of a maladaptive trait. First, rape is simply too common in the animal kingdom to be the product of a trait that repeatedly resurfaces in the face of negative selection pressure over evolutionary time. See *id.* at 141. Rape in other animals is explored in Part II, *supra*. Second, the cross-species and cross-human-society patterns of female resistance to rape, and the increased avoidance of rape-risky encounters by reproductive age human females during the fertile parts of their cycles, suggest specific anti-rape psychological adaptations. See Thornhill & Palmer, *supra* note , at ch. 4 (citing Tara J. Chavanne & Gordon G. Gallup, Jr., *Variation in Risk Taking Behavior Among Female College Students as a Function of the Menstrual Cycle*, 19 *Evolution & Hum. Behav.* 27 (1998)). \par\par

(2) Evolutionarily Novel Environment: The second possible hypothesis of evolutionary influence on patterns of forced copulation involves positing that a predisposition that increases the likelihood of forced copulation is a currently maladaptive by-product of historically adaptive traits, which happen to be expressed

essed today in suddenly changed environmental circumstances (such as those precipitated by recent human technological and population growth). See Thornhill, *supra* note , at 143. Such an explanation might make sense in humans, were it not for the puzzlingly similar patterns of rape, under seemingly normal conditions , in so many other species. (Again, patterns of rape in humans and nonhumans are explored in greater detail, in Part II, *supra*.) Positing completely unrelated causal pathways, for humans and nonhumans, without both substantially more theoretical development, and persuasive evidence of how such similar patterns could arise independently, would be improperly unparsimonious. \par\par

(3) Genetic Drift: The third hypothesis of evolutionary influence on patterns of forced copulation derives from the effects of random chance on distributions of genes in successive generations - so-called 'genetic drift.' See Goldsmith, *supra* note , at 30-31; Strickberger, *supra*, at 515-18. For example, a local environmental catastrophe could wipe out individual animals in a population that might otherwise have had greater reproductive success than their contemporaries. That certainly would change the proportions of future populations in which copies of the unfortunate individuals' genes appeared, compared to what would have obtained in the absence of the catastrophe. \par\par

We can deduce, however, that drift cannot explain the persistence of heritable traits that impose significant costs on reproductive success. See Thornhill, *supra* note , at 143. The exponential effects of natural selection on the proliferation or diminishment of traits that have even small relative effects on reproductive success relentlessly decrease the proportion of a population bearing less successful traits. See *supra* text accompanying note . Consequently, if a propensity to force copulation in some circumstances imposed reproductive costs not otherwise compensated for with average reproductive benefits, genetic drift could not provide adequate explanation. \par\par

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COMMENT: GENETIC INFORMATION AND THIRD PARTY ACCESS TO INFORMATION: NEW JERSEY'S PIONEERING LEGISLATION AS A MODEL FOR FEDERAL PRIVACY PROTECTION OF GENETIC INFORMATION \par\par\pard

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SUMMARY: ... Although there has been great progress in the field of genetics, only recently have scientists begun to unravel the mystery of the human genome, which contains the genetic information of an individual's past and future. ...

Most genetic defects, however, do not yet have cures, leaving individuals with difficult decisions about genetic testing, which could give them an early indication of an incurable disease. ... New Jersey's genetic legislation, although largely focused on health insurance and employment discrimination, addresses

some of the greater social ramifications of the increased use of genetic information by creating a privacy right in an individual's genetic information. ... Although the potential for discrimination permeates our society, these state legislatures did not protect society from the use of genetic information, but instead narrowly focused on issues of genetic testing in health care insurance and employment. ... The creation of a property or privacy right in this information may not be the central issue in promulgation legislation - perhaps balancing these interests is the issue that should be addressed, although it remains to be seen whether the strength of the New Jersey statute will be affected by the deletion of the property right in genetic information. ... State legislation is inconsistent, with various states regulating health care or employment and others regulating only genetic testing and not general genetic information. ...

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TEXT: \5B*1105\5D \par\par

Our genes determine who we are: our physical characteristics, our predispositions to and fortifications from particular diseases, and, as many researchers now believe, our individual personality traits. n1 Although there has been great progress in the field of genetics, n2 only recently have \5B*1106\5D scientists begun to unravel the mystery of the human genome, which contains the genetic information of an individual's past and future. n3 Answers to elusive questions and ties between human genetics and disease are today discovered on almost a daily basis. n4 Modern research concentrates on sequencing the human genome and unraveling the genetic code to discover information about the causes of genetic defects and diseases. n5\par

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n1. See Sonia M. Suter, Note, *Whose Genes Are These Anyway?: Familial Conflicts over Access to Genetic Information*, 91 Mich. L. Rev. 1854, 1856-57 (1993).

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Genes are located in the nucleus of each of the one hundred thousand billion cells in the human body. See Janet A. Kobrin, Comment, *Confidentiality of Genetic Information*, 30 UCLA L. Rev. 1283, 1286 (1983). \i0 Genes are comprised of nucleic acids, Ribonucleic Acid and Deoxyribonucleic Acid, and are carried by chromosomes. See *id.* at 1286 n.23. \i0 Twenty-three pairs of chromosomes comprise the human genome, one set inherited from the mother and the other set from the father. See Richard A. Bornstein, Note, *Genetic Discrimination, Insurability and Legislation: A Closing of the Legal Loopholes*, 4 J.L. & Pol'y 551, 555 & n.19 (1996); see also Suter, *supra*, at 1856 & n.12. Chromosome pairs contain the identical number and sequence of genes as its partner. See Kobrin, *supra*, at 1256. The genes carried within these chromosomes dictate a person's genetic structure and physical appearance. See Suter, *supra*, at 1856-57. Each body or human cell performs a specific function, thereby utilizing only a specific portion of the genetic information contained within its nucleus. See *id.* at 1856.

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Genetic defects can occur in several different ways. See Kobrin, *supra*, at 1287. For example, a genetic sequence transmitted from a parent that lacks the proper genetic coding can affect the chromosomes. See *id.* A mutation in a parent's gene can cause a single gene disorder, which scientists now know causes disorders like sickle cell anemia and cystic fibrosis. See *id.* The interaction of more than one miscoded gene can cause a polygenic disorder such as spina bifida. See *id.* at 1288-89. Finally, variations in number or structure of the chromosomes can cause a disorder such as Down's Syndrome. See *id.* at 1289. \par\par

Scientific research indicates that more than 5,000 disorders are genetically

related. See Bornstein, *supra*, at 557-58. Many disorders are caused by the genetic defects as described above, but others may result from a genetic predisposition to the disease. See *id.* An inherited genetic disorder carries a greater probability than a mere predisposition to genetic disease that the disease will develop. See *id.* at 558 n.31. Beyond genetic diseases, personality traits, such as alcoholism and shyness, have been linked to particular genes. See *id.* at 559 n.37. \par\par

n2. See Genetics Hearing Before the Labor HHS Committee: Hearing on S. 1694 Before the Senate Comm. On Labor, 104th Cong., July 25, 1996, available in \i 1996 WL 421688\i0 (Statement of Olympia Snowe)\5Bhereinafter Snowe\5D; see also Helen R. Bergman, Comment, *Moore v. Regents of the University of California*, \i 18 Am. J.L. & Med. 127, 127 (1992)\i0 (discussing the pace of scientific research, the resulting medical advances and the developing ethical dilemmas left to encounter); Bornstein, *supra* note 1, at 557 (stating that genetic disorders affect approximately half of the current U.S. population). \par\par

n3. See Catherine M. Valerio Barrad, Comment, Genetic Information and Property Theory, \i 87 Nw. U. L. Rev. 1037, 1041 n.16 (1993).\i0 In 1983, scientists knew the locations of only 606 genes; however, by 1993, the location of more than 5,000 more genes had been determined. See *id.* \par\par

Discovering the location of individual genes is essential in developing a map of the human genome, which is the compilation of a person's total genetic information. See LeRoy Walters & Julie Gage Palmer, *The Ethics of Human Gene Therapy* 4 (1997); see also *infra* notes 18-23 and accompanying text (discussing the Human Genome Project, an attempt to decode the human genome). \par\par

n4. See Charles Craig, *Genomes Progressing Rapidly, But to What End?*, *Bioworld Today*, May 22, 1997, available in LEXIS, Nexis Library, Curnews File (discussing the rapid advancements in human genomics science). From 1986 to 1992, sixteen disease genes were located, and in 1993 alone, seventeen disease genes were found. See *id.*; see also Burk Burnett, Comment, Genetic Discrimination: Legislation Required to Keep Secrets, 21 *Seton Hall Legis. J.* 502, 512 (1997) (stating that '\22rapid advancements in genetic technology compelled redefinition of many of the initial goals\22 of the human genome project). This evolving source of knowledge will most likely change the entire course of modern medicine. See *id.*; Snowe, *supra* note 2 ('\22Who could have predicted 20 years ago that scientists today could accurately identify the genes associated with cystic fibrosis, cancer, and Alzheimers disease? Today, scientists can, and as a result doctors are increasingly able to identify predispositions to certain diseases based on the results of genetic testing.\22). \par\par

Genetic '\22linkage studies\22 are helping to increase the pace of genetic information by allowing more individuals to learn about their predispositions to certain diseases. See Alexander Morgan Capron, *Which Ills to Bear?: Reevaluating the '\22Threat\22 of Modern Genetics*, \i 39 Emory L.J. 665, 686-89 (1990)\i0 (discussing the current practices of genetic screening); see also Bornstein, *supra* note 1, at 558-59 (highlighting the utility of genetic testing as well as the recent advances in genetic science). \par\par

n5. See Alexandra K. Glazier, Genetic Predispositions, Prophylactic Treatments and Private Health Insurance: Nothing Is Better Than a Good Pair of Genes, \i 23 Am. J.L. & Med. 45, 45-46 (1997);\i0 see also J. Madeleine Nash, *To Know Your Own Fate*, *Time*, Apr. 3, 1995, at 62 (commenting on the need for improved testing for Alzheimer's disease because there is not yet a medical cure). Although currently more than four million people in the United States suffer from Alzheimer's disease, scientists developed solid theories about the progression of the disease only recently. See *id.* Alzheimer's has no cure yet, and presently only one drug, Tacrine, is FDA approved for use against the disease. See *id.* How

ever, even Tacrine only temporarily eases symptoms and is not intended as a long-term treatment. See id. \par\par

Scientists have also identified a genetic link to the cause of allergies, which presently affect 40 to 50 million Americans each year. See Charles W. Henderson, Allergy: Scientists Identify a Strong Genetic Link to Allergies, *Gene Therapy Wkly.*, Jan. 5, 1998, available in LEXIS, News Library, Curnews File. The genetic mutation found will make it easier to identify individuals susceptible to allergies and will eventually aid in the development of more effective treatments. See id. \par

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'5B*1107'5D Through genetic sequencing techniques, scientists are deciphering patterns of genetic information contained within deoxyribonucleic acid (DNA), which encodes proteins and physical processes within the human body. n6 Scientists already are able to explain the origin of a disease such as breast cancer, by identifying the specific genetic defect which causes it. n7 A direct link between Alzheimer's disease and the Apo E4 gene has also recently been discovered. n8 Most genetic defects, however, do not yet have cures, leaving individuals with difficult decisions about genetic testing, which could give them an early indication of an incurable disease. n9\par

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n6. See James D. Watson, *The Human Genome Project: Past, Present and Future*, 248 *Sci.* 44, 44 (1990). Once the DNA can be completely deciphered, scientists hope to gain a better understanding of the underpinnings of human existence. See id. The Human Genome Project's ultimate goal is to facilitate scientific understanding of disease progression. See id.; see also James D. Watson & Robert Mullan Cook-Deegan, *The Human Genome Project and International Health*, *N.Eng. J. Med.* 3322, 3322 (1990).\i0 \par\par

The main benefit of the Human Genome Project will be revolutionary knowledge about the diseases that affect humankind on a global level. See id. Currently, however, medical technology cannot effectively detect disease or increased susceptibility to disease. See *Assessing Genetic Risks 1* (Lori B. Andrews et al. eds., 1994). Therefore, there is an increased pressure to broaden both the screening programs and genetic tests. See id. at 2. \par\par

n7. See Gina Kolata, *Research Links Single Gene to Almost All Breast Cancers*, *N.Y. Times*, Nov. 3, 1995, at A1 (discussing the isolation of the breast cancer gene as a new discovery resource); see also *Breast Cancer in Young Tied to Faulty Gene*, *N.Y. Times*, Jan. 18, 1996, at A19 (stating that a defect in the gene BRCA1 is linked to breast cancer in women with a family history of breast cancer, as well as, those women in their later twenties and early thirties without a family history of breast cancer); cf. Barbara L. Weber et al., *Familial Breast Cancer: Approaching the Isolation of a Susceptibility Gene*, 74 *Cancer* 1013, 1018 (1994) (commenting that the identification and isolation of the BRCA1 gene will soon lead to the widespread availability of screening, allowing for women to detect their risk of developing the disease). \par\par

Women who are genetically tested for breast cancer need to remain cautious because a negative result does not erase the possibility of developing breast cancer. See Charlene Laino, *Should You Be Genetically Tested?* (visited Jan. 24, 1998) <<http://www.msnbc.com/news/116977.asp>>. According to the Chief of Clinical Genetic Services at Memorial Sloan-Kettering in New York, '22a negative breast-cancer test result will give women a false sense of security.'22 See id. The

reason for this is that the majority of breast cancers are not caused by a defective gene. See id. \par\par

n8. See Gina Kolata, *If Tests Hint Alzheimer's Should a Patient Be Told?*, N. Y. Times, Oct. 24, 1995, at A1; see also Nash, *supra* note 5, at 62 (describing problems encountered in the past with diagnosing Alzheimer's disease and recognizing the renewed hope of a more precise test). \par\par

n9. See Glazier, *supra* note 5, at 45 n.1 (explaining that early detection is deceptive because instead of prolonging life, it merely increases the length of time the individual is aware of the illness). Studies comparing the survival percentages from the time of diagnosis have been conducted to determine the effectiveness of early detection. See id. The developing genetic technology can potentially confuse or harm the public by creating the belief that an early diagnosis eradicates disease. See William C. Black & H. Gilbert Welch, *Advances in Diagnostic Imaging and Overestimations of Disease Prevalence and the Benefits of Therapy*, 328 New Eng. J. Med. 1237, 1237, 1239-42 (1993). In reality, for most diseases, early detection garners little benefit. See id. \par\par

Studies on early genetic defect diagnosis have revealed a phenomenon known as 'lead time bias.' See Glazier, *supra* note 5, at 45 n.1. Lead time bias denotes the fact that one's life span after early detection of disease is typically the same as if it were detected later in its progression; the individual usually will die at the same age. See id.; see also Black & Welch, *supra*, at 1239-42 (defining 'lead-time bias' in genetic disease detection). \par\par

A recent Johns Hopkins University study showed that doctors misinterpreted the genetic test results in nearly one-third of patients who were tested for a colon cancer gene. See Charlene Laino, *Protect Against Gene Discrimination - Group Calls for Patient Safeguards* (visited Jan. 24, 1998) <<http://www.msnbc.com/news/63631.asp>>. The results of this study have led to calls for patient safeguards from the National Action Plan on Breast Cancer (NAPBC). See id. The NAPBC's position is that the medical community cannot wholly rely on information from the genetic researchers, but rather must participate in the synthesis of the information when forming their own understanding. See National Action Plan on Breast Cancer & American Society of Clinical Oncology, *Hereditary Susceptibility to Breast and Ovarian Cancer: An Outline of the Basic Fundamental Knowledge Needed by All Health Care Professionals* (visited Jan. 24, 1998) <<http://www.napbc.org/napbc/hshedcurr.htm#potential>>. \par\par

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'5B*1108'5D As technology advances, courts and legislatures lag behind, unprepared to answer the innumerable legal questions raised by genetic research. n10 Although legislative proposals to regulate the use of genetic information and genetic testing have arisen in both the United States '5B*1109'5D House of Representatives n11 and the United States Senate, n12 Congress has failed to enact any substantial legislation. n13 The passage of the Health Insurance, Portability and Accountability Act in 1996, more commonly known as the Kennedy-Kassenbaum Bill, marks the indirect beginning of congressional involvement with genetic information regulation. n14 Although this Act contains a provision which prohibits the classification of genetic predispositions as preexisting conditions by insurance companies, the provision is narrow in scope and neglects many of the present and developing concerns about the use and abuse of genetic information. n15 Notably, the provision fails to address important issues, such as mandatory genetic testing by insurance companies used to determine eligibility for coverage and the maintenance of confidentiality of t

he results of genetic testing. n16 The provision also leaves many avenues of genetic discrimination unprotected. n17\par

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n10. See Kathy L. Hudson et al., Genetic Discrimination and Health Insurance : An Urgent Need for Reform (visited Jan. 24, 1998) <<http://www.edoc.com/aaas/policy/gene-tics.html>>; see also Michael M.J. Lin, Note, Conferring a Federal Property Right in Genetic Material: Stepping into the Future with the Genetic Privacy Act, 122 Am. J.L. & Med. 109, 110 (1996) (stating that courts and legislatures have failed to establish a national policy for regulating the use of genetic information and biological materials); cf. Kobrin, supra note 1, at 1284 (claiming that genetic screening legislation has not been successful and suggesting that courts have confused genetic information issues with the principles of tort law). \par\par

n11. See Genetic Information Nondiscrimination in Health Insurance Act of 1997, H.R. 306, 105th Cong. (1997); see also Why We Need H.R. 306 (on file with author) (finding that H.R. 306 was proposed in response to concerns that genetic information will be used to prevent people from obtaining health insurance). H.R. 306, proposed by Representative Slaughter, attempts to ensure that the public has access to their genetic information without encountering discrimination by their insurance companies. See Genetic Information Nondiscrimination in Health Insurance Act of 1997, H.R. 306, 105th Cong. (1997). This legislation is intended to close the legal loopholes remaining after the passage of the Kennedy-Kassenbaum health care reform bill. See Letter from John Edward Porter & Louise McIntosh Slaughter, Members of Congress, to Members of Congress (Sept. 12, 1996) (on file with author); see infra note 14 and accompanying text (discussing the shortcomings of the Kennedy-Kassenbaum bill). The following are among the provisions included in H.R. 306: (1) amendments to the Employee Retirement Income Security Act of 1974 (ERISA); (2) amendments to the Public Health Service Act; and (3) amendments to the Internal Revenue Code. See Why We Need H.R. 306, supra. The combined purpose of these amendments is to restrict health care plans from discriminating against those with genetic defects. See id. \par\par

According to the proposed legislation, federal law is necessary to protect this information because state laws can affect only state-regulated insurance companies, thereby excluding large, multi-state employers regulated under ERISA. See id. Because it only addresses genetic discrimination in health insurance, this legislation is not intended to impact clinical trials or clinical research.

See id.; see also Bornstein, supra note 1, at 579 (noting that legislation protecting genetic information from insurers has not been enacted). On January 7, 1997, H.R. 306 was referred to the Commerce, Ways and Means Committee, and the Education in the Workforce Committee for consideration. See Bill Summary & Status for the 105th Congress (on file with author) \5Bhereinafter H.R. 306 Bill Summary & Status\5D. As of the date of this article, H.R. 306 remains in committee, with hearings and mark-ups yet to be scheduled. See id. There have been six bills proposed to Congress which would protect this information from insurers, yet congressional action has not been forthcoming. See Bornstein, supra note 1, at 587. \par\par

n12. See Genetic Information Nondiscrimination in Health Insurance Act of 1997, S. 89, 105th Cong. (1997). The Act is the pending Senate legislation which prohibits discrimination against individuals on the basis of genetic information. See id. This bill, introduced by Senator Snowe from Maine, has been read twice, as of the date of this article, and referred to the Committee on Labor and Human Resources. See Bill Summary & Status for the 105th Congress (visited Jan.

24, 1998) <<http://thomas.loc.gov>>. Little progress has been made on the legislation, as it has been pending in the Senate since the 104th Congress. See Genetic Information Nondiscrimination in Health Insurance Act of 1997, S. 1694, 104th Cong. (1996); see also Snowe, *supra* note 2 (urging the Senate Labor Committee to support the Senate bill, S. 1694).

n13. See Genetic Information Nondiscrimination in Health Insurance Act of 1997; H.R. 306, 105th Cong. (1997); *supra* note 11; see also *supra* note 12 and accompanying text (discussing the status of proposed protective genetic legislation in the U.S. House and Senate). It is likely, however, that the 105th Congress could address the issue of human cloning, an issue that is closely related to the use of genetic information and testing, as early as 1998. See Human Cloning Research Prohibition Act, H.R. 922, 105th Cong. (1997).

Representative Ehlers (R-Mich.) introduced the Human Cloning Research Prohibition Act to the House of Representatives on March 5, 1997. See *id.* This bill prohibits the use of federal funding for conducting or supporting research on the cloning of humans. See *id.* Presently, the bill has been referred to committees on Science and Commerce for hearings and revisions. See Bill Summary & Status for the 105th Congress (visited Jan. 17, 1998) <<http://thomasloc.gov>>.

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The rapid action occurring on H.R. 922, as opposed to the inaction on H.R. 306, is largely in response to the first successful cloning of the sheep. See European Countries Sign Human Cloning Ban, *Star Trib.*, (Minn.-St. Paul), Jan. 13, 1998, at 1A. The physicist responsible for the cloning, Ian Wilmut, prompted the interest of Dr. Richard Seed who now attempts to clone human beings, an idea which received immediate condemnation in the United States and a strict banning in nineteen European Nations. See *id.*; Guy Gugliotta, United Against Human Cloning, *Hill Leaders Differ on Specifics*, *Wash. Post*, Feb. 4, 1998, at A4. President Clinton called the cloning of humans "profoundly troubling" and "morally unacceptable," and he urged rapid congressional action against its success. See *id.* Internationally, nineteen nations signed a treaty outlawing human cloning. See *id.* A medical ethicist in Paris described human cloning as "an insult to human rights." See *id.* In Britain, where sheep were cloned, leaders refused to sign the treaty claiming that it was too harsh. See *id.* By contrast, Germany refused to sign the treaty claiming it was too lenient. See *id.*

n14. See The Health Coverage Availability and Affordability Act of 1996, H.R. 3103, 104th Cong., 101 (1996) (prohibiting health care eligibility decisions to be based on health-status-related conditions and stating that genetic information cannot be considered in the absence of an actual diagnosis of the genetic disease).

Many critics believe that this bill is insufficient because it is too limited. See Karen Rothenberg, Genetic Testing Raises Real Fears of Molecular Discrimination, *The Tampa Tribune-Times*, Aug. 3, 1997, at 1. The Health Insurance Portability and Accountability Act of 1996 prohibits insurers from using genetic information to establish rules for eligibility and it prevents the use of genetic information about a person's predisposition to a disease as a basis for finding that the person has a preexisting condition. See *id.* However, it does not prevent insurers from raising rates, excluding coverage altogether, or imposing unlimited caps on coverage. See *id.* Moreover, the Act does nothing to prevent insurers from requiring genetic testing, nor does it protect the confidentiality of the test results. See *id.*

n15. See Rothenberg, *supra* note 14, at 1 (discussing the shortcomings of the Kennedy-Kassenbaum bill with respect to the use of genetic information regarding predisposition to disease).

n16. See id. \par\par

n17. See H.R. 3103, supra note 14 (attempting to '22improve portability and continuity of health insurance coverage\22); see also infra notes 53-76 and a ccompanying text (discussing the various existing forms of abuse of genetic inf ormation, such as mandatory genetic testing, employment discrimination, and eth ical societal dilemmas). \par

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\5B*1111\5D Congress has failed to produce legislation regulating geneti c information; however, it currently funds a program to facilitate genetic rese arch. n18 The Human Genome Project is a three billion dollar federally funded, international program to decode the human genome. n19 Sequencing the human geno me is the primary goal of the project, yet mechanisms also must be created to h elp society assimilate the information obtained from such genetic research. n20

In an attempt to develop \5B*1112\5D these assimilation mechanisms, the Human Genome Project's researchers analyze the practical effects of genetic inf ormation in our society. n21 The ethical, legal, and social implications of the project's work are studied contemporaneously as the scientific data is synthes ized. n22 Monitoring the implications of sequencing the human genome is a neces sary first step in preparing social institutions, such as health care providers and insurers, to use this information. n23\par

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n18. See Anita LaFrance Allen, Genetic Testing, Nature and Trust, \i 27 Seto n Hall L. Rev. 887, 887 (1997).\i0 The Human Genome Project began in the mid-1 980s as a research project coordinated between the National Institutes of Healt h and the Department of Energy. See Robert Mullan Cook-Deegan, The Human Genome Project: The Formulation of Federal Policies in the United States, 1986-1990, at 99 (Kathi E. Hanna ed. 1991). Today, it is an international program working to localize the estimated 50,000 to 100,000 genes within the human genome in an effort to create a detailed reference for scientists around the world. See All en, supra, at 887. This is a federally funded program costing roughly 200 milli on dollars per year. See id. The projected goal is to map the human genome by t he year 2005. See Victor A. McKusick, The Human Genome Project: Plans, Status, and Applications in Biology and Medicine 18 (George J. Annas et al. eds., 1992)

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As of 1996, the project mapped the 23 pairs of human chromosomes along with more than 15,000 DNA markers. See Charles Craig, Human Genome Project Accelerat ing Ahead of Ethics, Bioworld Today, March 6, 1996, available in LEXIS, Nexis L ibrary, Curnews File. The project is presently ahead of schedule, having alread y sequenced fragments of the human genome. See id. \par\par

Issues other than mapping the human genome surround this project. See Craig, supra note 4. Specifically, concern has been expressed about the growing compe tition to decode the genome by originators of the Human Genome Project. See id. Already two Genomics Conferences have convened providing a forum for researche rs to attract potential investors. See id. This growing financial activity rais es issues as to the quality of objective research and the goals of the project as well as disputes of patenting rights. See id.; see also Private Genes, \i 1 46 N.J.L.J. 26 (1996)\i0 (discussing concerns on behalf of pharmaceutical comp anies that individuals will demand royalties for the use of their genetic mater ial); cf. Elizabeth Finkel, The Post-Genome Era: Medical Promise with Problems, The Lancet, Apr. 26, 1997, at 1228 (noting that new biotechnical companies hav

e been started as a result of progress in genetic technology). \par\par

n19. See Allen, *supra* note 18, at 887; see also P.L. Pearson et al., The Human Genome Initiative - Do Databases Reflect Current Progress?, 254 Science 214, 214 (1991) (stating that human genetic sequence data are compiled internationally in three public databases and a number of specialized research databases).

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n20. See generally Yank D. Coble, Jr., Prepared Statement of Yank D. Coble, Jr., M.D. for the American Medical Association Before the House Committee on Commerce Task Force on Health Records and Genetic Privacy, Federal News Service, July 22, 1997 (stating that efforts to enact federal laws lag behind science and noting that the scientists involved with the Human Genome Project have developed and published recommendations for policy makers to protect individuals from genetic discrimination). \par\par

The following recommendations were developed by Dr. Coble and the American Medical Association: \par\par

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(1) Prohibit insurers from establishing rates based on genetic information; \par\par

(2) Prohibit insurers from making coverage decisions based on genetic information; \par\par

(3) Prohibit insurers from requesting or requiring collection or disclosure of genetic information; \par\par

(4) Prohibit any holder of genetic information (including insurance companies) from releasing that information without prior written consent from the individual. \par\par

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See *id.* \par\par

n21. See Ethical, Legal and Social Implications (ELSI): High Priority Areas, (visited August 28, 1997) <<http://www.nhgri.nih.gov/About/NHGRI/Der/Elsi/highpriority.html#Research>> (detailing the '22 high priority' areas for current ELSI research). There are several areas of concern include: (1) promoting privacy and fairness in the use of genetic information; (2) education of health care professionals in the use of genetic technologies; (3) targeting issues surrounding genetic research such as informed consent; and (4) promoting public and professional education. See *id.* \par\par

n22. See *id.* Mapping the human genome raises questions as to how medicine will be practiced in the future and how to balance the immense capability of reading the human body while maintaining autonomous choice and protecting a '22 genetically bare' and vulnerable human body. See John C. Fletcher & Dorothy C. Wertz, Ethics, Law, and Medical Genetics: After the Human Genome Is Mapped, 39 Emory L.J. 747, 747-48 (1990). \par\par

n23. See Coble, *supra* note 20 (listing the American Medical Association's recommendations as to the means by which state and federal policy makers should protect individuals against genetic discrimination). \par

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As opposed to Congress, traditionally courts have relied on the use of genetic information as a sentencing guideline in both civil and criminal litigation, providing a narrow body of case law on the issue. n24 Genetic information has been relied on in the courtroom in a variety of situations, including DNA forensic testing and child custody disputes. n25 \par

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n24. See \i United States v. Jakobetz, 955 F.2d 786, 791-93 (2d Cir. 1992)\i0 (noting the significance of DNA in the human composition and describing the significance of DNA testing in criminal procedures); Dorothy Nelkin, After Daubert: The Relevance and Reliability of Genetic Information, \i 15 Cardozo L. Rev . 2119 (1994)\i0 (discussing the use of genetic information in the courtroom).

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In DNA forensic analysis, portions of the DNA structure take different forms in different individuals creating areas called polymorphism. See \i Jakobetz, 955 F.2d at 791.\i0 Polymorphisms are significant in DNA forensic testing because, by focusing on specific portions of them, scientists establish a percentage of individuals who are likely to have the same DNA structure. See id. Scientists unravel the DNA structure, thereby breaking it into shorter fragments, and eventually splitting into two single strands of DNA. See \i id. at 792.\i0 A single strand is attracted to other complimentary strands, which then gravitate toward each other and connect to form a double helix model. See id. This process is called '22hybridization.'22 See id. A genetic probe is constructed by scientists during hybridization, which seeks out and locks onto complimentary strands, thereby locating the polymorphic strands of DNA. See id. Once this process is complete, the FBI calculates the statistical significance of a match between two DNA profiles using tools from the field of human population genetics. See \i id. at 793.\i0 This technique has been deemed reliable evidence in judicial proceedings. See \i id. at 799-800\i0 (finding forensic analysis acceptable where it is shown to be reliable). \par\par

n25. See Nelkin, supra note 24, at 2120. In Daubert v. Merrell Dow Pharmaceuticals Inc., the United States Supreme Court dealt with admissibility standards regarding the use of scientific information in the courtroom. \i 509 U.S. 579 (1993).\i0 In Daubert, the Court defined some indicators of scientific reliability, including whether the evidence has been tested, subjected to peer review and publication, derived through a set of standards with a known error rate, and is generally accepted in the scientific community. See \i id. at 593-94.\i0 In the courtroom, genetic information is typically used for DNA forensic testing; however its uses are increasing to family relationships and criminal responsibility. See Nelkin, supra note 24, at 2120. \par\par

In child custody cases, courts have shifted from focusing on '22the best interests of the child'22 to a reliance on genetic information to dispute the importance of genetic and emotional bonds. See id. (exemplifying the use of genetic information in child custody disputes and noting the inconsistency of judicial decisions on the issue). Instead of relying solely on testimony establishing that one parent provides a better home for the child than the other, courts now also consider genetic testimony indicating personality traits. See id. at 2020-21. \par

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Genetic information also has been used in criminal law as a mitigating factor in determining punishment. n26 Courts have viewed defendants genetically predisposed to commit crime as purportedly lacking free will. n27 Thus, some courts take a defendant's genetic make-up into account during sentencing.\par

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n26. See Nelkin, *supra* note 24, at 2121 (stating that genetic information is used as guidance in decisions concerning responsibility and punishment). Genetic information is used as the basis for a defense and in order to mitigate punishment under the claim that genetic predispositions preclude free will. See *id.* at 2021. For example, Positron Emission Tomography (PET) scans have been allowed in court as a way to determine sanity. See Cerisse Anderson, Brain Scan Deemed Admissible at Trial: *vi* Guilty Plea Follows Insanity Defense Ruling, 208 N.Y. L.J. 1 (1992)*vi*0 (recounting the trial of a man accused of strangling his wife and throwing her out the window of their twelfth floor apartment). \par\par

n27. See Nelkin, *supra* note 24, at 2120. Genetic information often guides criminal cases because the growing body of research has suggested connections between genetic predisposition and violence. See *id.* at 2123. Therefore, genetic information provides a background for decisions regarding responsibility and punishment. See *id.* at 2120. A genetic explanation for behavior has relieved defendants from a degree of personal responsibility for their actions. See *id.* at 2121-22 (recounting a disbarment proceeding in which the court accepted a genetic predisposition to alcoholism defense as an excuse for misappropriation of funds and mitigated punishment based on the genetic predisposition). \par\par

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Outside of the sentencing proceedings, courts have provided little guidance on the use or regulation of genetic information. n28 Modern case \5B*1114\5 D law does not address the concerns of access to and discrimination in the use of genetic information. n29 A significant case related to the use of genetic information is *Moore v. Regents of the University of California*, n30 where the California Supreme Court, in denying a claim for conversion of bodily tissue, held that cells were abandoned once they were removed from the plaintiff's body. n31 There is little case law that directly addresses genetic information. n32 However, in *Mayfield v. Dalton*, n33 the Ninth circuit was asked to determine the constitutionality of a requirement that United States marines provide blood and tissue samples to the federal government for future DNA testing. n34 The District Court below granted the government's Motion for Summary Judgment on the theory that stored DNA would help to identify a soldier's remains. n35 The appellate court denied the appeal as moot and both plaintiffs were honorably discharged. n36\par

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n28. See Lin, *supra* note 10, at 110 (noting that very few cases address property rights in a person's genetic material); see also Bertram I. Rowland, Legal Implications of Letter Licenses for Biotechnology, 1 High Tech. L.J. 99, 129 (1986) (stating that commerce related to biological material will proceed cautiously due to the legal instability in this area). \par\par

n29. See Lin, *supra* note 10, at 110. \par\par

n30. *vi* 793 P.2d 479 (Cal. 1990).*vi*0 \par\par

n31. See *vi* *id.* at 488-89.*vi*0 John Moore, suffering from hairy cell leukemia, underwent surgery for the removal of his enlarged spleen. See *vi* *id.* at 480-81.*vi*0 Moore recovered from the cancer, but continued to return for evaluations at the request of his doctor, who used Moore's tissue, blood, bone marrow, and other samples in order to continue research on his cancer. See *vi* *id.* at 481.*vi*0 A cell line, worth \$3.01 billion, was established from the use of Moore's samples and the Regents of the University of California obtained a patent. See

\i id. at 481-82.\i0 Moore brought suit against the doctors and the University claiming unlawful conversion of bodily property and lack of informed consent. See \i id. at 482.\i0 The California Supreme Court ruled against Moore on the ground that allowing him to retain an interest in the cells would hinder scientific research. See \i id. at 494-95.\i0 \par\par

n32. See Lin, *supra* note 10, at 110. \par\par

n33. \i 109 F.3d 1423 (9th Cir. 1997).\i0 \par\par

n34. See \i id. at 1424;\i0 see also Lori Andrews, *Body Science*, \i 83 A.B. A. J. 44, 46 (1997)\i0 (stating that the Marines argued that the mandatory testing constituted a Fourth Amendment search and seizure violation); *Concerns About Privacy of Military Specimens Are Addressed, Court Says*, *Biotechnology*, Apr. 11, 1997, available in LEXIS, Nexis Library, Curnews File (highlighting the 9th circuit opinion in *Mayfield* and stating that the Marines feared that the military would abuse their genetic information); \par\par

n35. See \i *Mayfield v. Dalton*, 109 F.3d 1423, 1425 (9th Cir. 1997).\i0 \par\par

n36. See *id.* \par

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Apart from the legislative and judicial forums, much of the apprehension regarding the use of genetic information arises from possible discrimination fears, such as higher insurance premiums, increased risk of employment termination, and public disclosure of genetic information. n37 \5B*1115\5D Genetic discrimination is defined as discrimination against an individual based solely on the differences between the \22defective\22 genetic composition of the individual and the perceived \22normal\22 gene. n38 An informal, 1996 study determined that nearly half of the respondents suffering from various forms of genetic disease experienced some form of genetic discrimination. n39 Health care insurance and employment discrimination are among the immediate concerns related to the expanded knowledge of genetic information; however, the list has evolved to now include blanket societal discrimination. n40 Psychological stress caused by the option of genetic testing and the growing potential for familial conflicts are other effects of the advancing technology. n41\par

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n37. See *Why We Need H.R. 306*, *supra* note 11; see also Leslie P. Francis, *Recent Developments in Genetic Diagnosis: Some Ethical and Legal Implications*, \i 1986 Utah L. Rev. 483, 488\i0 (discussing concerns about abuse of genetic information by employers, insurers, and the health care system); Steven Brostoff, *Clinton Calls for Ban on Using Genetic Test Data; Health Insurance Groups Differ in Reaction to President Clinton's Proposal*, *National Underwriter Life & Health-Financial Services Ed.*, July 21, 1997, at 3 (recounting statements of President Clinton calling for legislation barring health insurers from using genetic information to deny coverage or increase premiums). The Health Insurance Association of America opposed Clinton's plan because it would adversely affect health by individuals by increasing rates across the board. See *id.* The Association's president, Karen Ignagni, stated, \22it is critically important to guarantee that health care services for people with genetic illnesses are effectively coordinated and that those providing health care to these individuals have the information needed for the highest quality of care.\22 *Id.*; see also Patricia King, *The Past as Prologue: Race, Class and Gene Discrimination*, *Gene Mapping: Using Law and Ethics as Guides* 94, 95-108 (George J. Annas & Sherman Elias eds., 199

2) (analyzing the correlation between race and genetic discrimination). In order for all of society to benefit from emerging genetic information, there must be a massive overhaul of our existing health care system and the policy implications of differences among human beings must be taken into account. *Id.* at 107. \par\par

n38. See Marvin R. Natowicz et al., Genetic Discrimination and the Law, 50 *Am. J. Human Genetics* 465, 466 (1992). \par\par

n39. See Rosemary Orthmann, Study Reveals Cases of Genetic Bias, *Law & Policy Reporter*, June 1996, at 85. Four genetic disorders, were the focus of this study to which roughly 455 people responded. See *id.* The most common sources of discrimination: health and life insurance companies. See *id.*; see also Snowe, *supra* note 2; Poll Shows Dark Side of Genetic Research, *Houston Chron.*, Oct. 25, 1996, at A5. \par\par

n40. See Hudson, *supra* note 10 (giving examples of health care and employment discrimination, as well as societal discrimination). \par\par

n41. See Suter, *supra* note 1, at 1855-56 (discussing the psychological effects of genetic testing). \par

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Without federal or judicial guidance, state legislatures have taken the initiative by protecting the use of genetic information and genetic testing. n42 Unfortunately, most state legislation fails to address both present and potential legal ramifications, thereby increasing the need for national legislation. n43 State legislation also exemplifies the increasing confusion concerning the level of constitutional protection genetic information should receive. n44 Specifically, the controversy involves the issue of whether genetic information is or should be classified as a privacy right or a property right. \par

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n42. Genetic legislation has been enacted in the following states: *Ariz. Rev. Stat. Ann.* 20-448 (West & Supp. 1995); *Cal. Civ. Code* 56.17 (West Supp. 1998); *Colo. Rev. Stat.* 10-3-1104.7 (1997); *Fla. Stat. Ann.* 760.40 (West Supp. 1996); *Ga. Code Ann.* 33-54-1 to 8 (1996); *Md. Code Ann. Ins.* 223 (Supp. 1996); *Minn. Stat. Ann.* 72A.139 (West Supp. 1998); *Mont. Code Ann.* 33-18-206 (1997); *N.H. Rev. Stat. Ann.* 141-H:1 to 6 (Supp. 1995); *N.J. Stat. Ann.*, 10:5-43 to -49 (West Supp. 1996); *Ohio Rev. Code Ann.* 1751.63-1751.65 (Anderson 1997); *Or. Rev. Stat.* 659.700- 659.720 (1995); *Wis. Stat. Ann.* 631.89 (West 1995). \par\par

n43. See Philip Reilly, New Jersey Genetic Privacy Act, 1 *The Gene Letter* 1, &3 (July 1, 1996) <<http://www.geneletter.org/0796/njprivacyact.html>> (stating that the majority of law concerning genetic testing and information focuses on preventing health insurance discrimination and does not include protection against other forms of discrimination). \par\par

n44. See *infra* notes 83-89 and accompanying text (discussing the dilemma facing state legislatures as they attempt to protect genetic information while maintaining a high level of scientific research). \par

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The Genetic Privacy Act of 1996, n45 passed by the New Jersey Legislature, is an exception to the general inadequacy of state legislation. n46 Commentators have heralded the New Jersey legislation as one of the broadest state measures

that offers protection on a variety of levels and acknowledges the political, moral, and social significance of genetic information. n47 Due to its comprehensiveness, New Jersey's legislation has also been labeled by commentators as a model for other states and the nation. n48\par

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n45. 1996 N.J. ch. 126; 17B:30-12. \par\par
n46. See Burnett, supra note 4, at 525-26; see also infra notes 82-89 and accompanying text (discussing the breadth of the New Jersey statute in relation to more restrictive statutes enacted in other states). \par\par
n47. See New Jersey: Governor Signs Genetic Privacy Act, Health Line, Nov. 20, 1996, available in LEXIS, Nexis Library, Curnews File; see also Burnett, supra note 4, at 525 (claiming that New Jersey's Genetic Privacy Act is 'one of the most comprehensive measures in protecting against genetic discrimination in the nation'). New Jersey's legislation surpasses protective bills pending in other states because of its heightened standards. See Burnett, supra note 4, at 526 (footnote omitted). \par\par
n48. See supra note 47 (describing the comprehensive nature of the legislation). \par

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This Comment examines the classification of genetic information as a property and privacy right. Specifically, this Comment provides a practical analysis of New Jersey's Genetic Privacy Act to determine whether it is a model for a national policy. Part I examines the abbreviated legislative history of the Act, focusing on the deletion of property rights in genetic information. Part I also demonstrates the breadth of New Jersey's statute by way of illustrations of how this information is misused. Part II analyzes the competing property and privacy interests involved in access to genetic information, focusing on the ramifications of these interests in a national policy. This Comment then suggests that the classification of genetic information as a property or privacy right should not be the focus of a national policy. Rather, it suggests that Congress should enact legislation that adequately addresses the complexity and uniqueness of genetic information without limiting its focus to classifying the nature of the right. This Comment also asserts that issues surrounding genetic information transcend science and medicine, and travel to the core of what it means to be human. This Comment concludes that these issues are politically, ethically, morally, and practically significant and should not be addressed piecemeal by the courts or indiscriminately by state legislatures. \par\par

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Genetic Discrimination\par
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Controlling the use of genetic information is essential because genetic discrimination affects all aspects of society, revealing fundamental components of what differentiates one human from another and thereby opening the door to numerous forms of discrimination. n49 The most obvious and perhaps the most active areas of discrimination are insurance coverage and employment. n50 Social discrimination potentially may result from unfair insurance and employment practices. n51 As research progresses, the potential for discrimination similarly heightens. n52\par

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n49. See Why We Need H.R. 306, *supra* note 11; Phil Bereano, Don't Take Liberties with Our Genes, *The Seattle Times*, July 17, 1997, at B5 (discussing the effects of the public 'discourse' on genetic information). Science and technology are not 'value-neutral.' Id. It is feared that 'predictability will replace a tolerance for natural variation and diversity.' See *id.* Further, society's growing fascination with genetic research and human health has the potential to cause the neglect of other health factors. See *id.* For example, a connection between environmental factors and cancers had been established. See *id.* However, if cancer becomes recognized as a purely genetic disease, efforts to improve the environment may be completely disregarded. See *id.* Social conditions such as poverty, which contribute to high mortality rates, will also become less important as people are faulted for having defective genes. See *id.* \

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n50. See Allen, *supra* note 18 (naming employment discrimination and health insurance barriers as outgrowths of human genetic research); see also *infra* notes 53-66 and accompanying text (exploring the health care and employment issues surrounding the use of genetic information). \par\par

n51. See King, *supra* note 37, at 95 (expressing skepticism as to whether the information obtained from the Human Genome Project will be beneficial to all members of our society). As correlations between genetic diseases and race are discovered, there is a possibility that racial discrimination and stereotyping will increase. See *id.*; see also *infra* notes 67-76 and accompanying text (elaborating on the growing fear of societal discrimination resulting from the abuse of genetic information). \par\par

n52. See King, *supra* note 37, at 95. \par

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Insurance Discrimination\par

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Presently, insurance companies are free to charge higher premiums or even to cancel coverage for individuals with preexisting health conditions '1118' 5D as a 'cost-control' measure. n53 In the absence of laws governing the use of genetic testing, and making mandatory testing illegal, cost-control measures may soon impact those inflicted with genetic illnesses or with histories of genetic problems. n54 Stories about parents who are unable to obtain insurance for their children because of a hereditary genetic defect n55 and insurance companies threatening to cancel insurance based on the results of prenatal testing n56 are surfacing with great frequency. Eventually, the entire population will have access to their genetic information and as a result will be sorted into a particular genetic category. n57 Since no individual is genetically flawless, every person will be subjected to a '1119'5D mandatory genetic test to determine where the imperfections lie. n58 Insurance premiums and coverage will then be based on the degree of any flaw, leaving individuals at the mercy of their own genetic information. n59\par

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n53. See Glazier, *supra* note 5, at 46 (stating that it is common practice for