CHAPTER 33

Research in Forensic Psychiatry

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Landmark Case

***Kaimowitz v. Michigan Dept. of Mental Health*, 1 MDLR 147 (1973)**

Justice-involved individuals exhibit a wide range of behavioral problems and psychopathologies. They represent heterogeneous groups that end up in the judicial or correctional system for varying reasons. Given this heterogeneity, the need to improve the ability to identify factors that predict the causes and likelihood of antisocial behavior associated with psychiatric illness and the treatments administered to those who are justice-involved or incarcerated is real and pressing.

The disproportionate number of evaluees, parolees, and inmates with psychiatric problems provides a rich opportunity to understand the etiology and pathogenesis of mental illness and associated behaviors that may result in criminal convictions and incarceration. Forensic psychiatrists also have the opportunity to develop approaches to mitigate the maladaptive behaviors that have such profound social and personal impact and can result in arrest and incarceration. However, conducting forensic psychiatric research requires consideration of unique issues related to ethics and feasibility.

History of Forensic Psychiatry Research

Although research within the discipline of forensic psychiatry covers a broad spectrum of topics, the evolution of fo-

rensic psychiatric scholarship can be conceptualized in terms of three domains: causation, prediction, and intervention. Below are summaries of the application of forensic psychiatry to these domains.

Causation

Antisocial behavior (including impulsive, aggressive, predatory, and/or violent actions) generates physical, emotional, and economic burdens. For example, during 2014, incidents of violent and nonviolent crime in the United States approached 31,000 per day, and the financial impact on society was estimated as over 3 trillion dollars (U.S. Department of Justice 2015). The pervasiveness of these behaviors highlights the importance of identifying those specific causal factors that are etiologically related to the onset and maintenance of antisocial behavior.

The first attempts to describe the factors that contribute to the development of antisocial tendencies focused on the physical makeup of offenders. Empirical studies portrayed criminal behavior as a function of a single factor or trait, such as body type or defective intelligence (Goring 1913). Multigenerational family studies (Dugdale 1877; Goddard 1912) purported that some traits could be identified as socially inferior and that those traits were heritable. This type of research was used to support the pseudoscience of eugenics and related practices, such as the "scientific" breeding of human beings and sterilization of individuals with inferior or dangerous heritable traits.

Current research focuses on genetic studies, which have the potential to parse the heterogeneity of antisocial behavior based on differential levels of risk in the context of other causal factors. Evidence clearly indicates that specific genotypes confer risk for antisocial behavior and aggression as well as psychiatric conditions related to increased risk of behaviors that may result in criminal justice involvement or incarceration (e.g., substance use disorders, borderline personality disorder, bipolar disorder) (Baker et al. 2006; Viding and Frith 2006). However, equally clear evidence demonstrates that the interaction between genetic and environmental mechanisms is of major importance in explaining individual differences in antisocial behavior (Simons et al. 2011).

Genetic and environmental factors increasingly are understood to shape the way in which biological systems develop and function, and thus affect multiple complex psychological processes important in controlling and regulating behavior (Barnes and Jacobs 2013; Caspi et al. 2002; Kim-Cohen et al. 2006). Nevertheless, important gaps in knowledge remain, and a future challenge for forensic psychiatry lies in determining the specific genetic and environmental influences that generate neurophysiological changes that result in the more proximal cognitive, affective, and behavioral risk factors for violence (Glenn and Raine 2014).

Prediction and Forensic Risk Assessment

In the 1970s, the prediction of an individual's potential dangerousness became a focus of attention in forensic psychiatry. At that time, predictions were largely based on clinical judgments. However, research on the accuracy of these predictions (referred to as first-generation risk predictions) demonstrated that clinicians were not much better than chance in predicting future violence (Monahan 1981).

These findings led to the development of actuarial or historical/static schemes to assess for risk for violence (see Chap-

ter 28, "Violence Risk Assessment"). This "second-generation" approach to risk assessment moved away from categorical predictions of "dangerousness" and toward a proportional estimate of violence risk (Monahan 1988). Instruments such as the Psychopathy Checklist—Revised (Hare 2003) and Violence Risk Appraisal Guide (Quinsey et al. 1998) used algorithms to identify individual risk trajectories (Hart et al. 2007; Singh et al. 2014). Unfortunately, these algorithms often demonstrated poor precision and high error rates.

A third generation of risk research focused on "risk management" (see Chapter 28). Structured professional judgment tools for risk assessment, such as the Historical Clinical Risk Management—20 (HCR-20; Webster et al. 1997), use a structured clinical assessment to evaluate an individual's risk and protective factors (Hart and Logan 2011). Unfortunately, the utility of these tools in clinical settings is limited by several practical issues, including concerns regarding validity and the availability of appropriate resources to administer the instruments.

More recently, the risk-need-responsivity approach has been implemented as an integrated risk assessment and classification model (Bonta and Andrews 2007, 2010). This model, originally developed for use with justice-involved individuals, is based on a social learning model of deviance and integrates multiple domains to classify and predict future behaviors. Some disagreement exists regarding the application of the risk-need-responsivity approach as a prediction tool (Taxman et al. 2006). However, the multiple-domain framework used to characterize a person's past and future behavior provides a more integrative assessment than any single measure.

Unfortunately, a lack of precision remains in the development of prediction tools, the use of those tools as evidence in forensic cases, and the standards that limit how those tools may be applied (Singh et al. 2015). As a result, evidence that includes their use may not be admitted in court proceedings, because such evidence may not meet the criteria for admissibility of scientific evidence (see Chapter 1, "The Expert Witness"). Consistent application of the *Daubert* criteria to scientific evidence was expected to result in a dramatic increase in forensic research–based testimony, but this has not proven true (Dahir et al. 2005; Shapiro et al. 2015). Nevertheless, the use of multiple levels of information across measures has the potential to improve the accuracy of prediction and the utility of these assessments in both clinical and forensic practice.

Intervention

For decades the U.S. judicial and correctional systems have struggled with an identity crisis centered on whether the purpose of incarceration is to punish or rehabilitate offenders. A strong shift toward a rehabilitative model began in the early twentieth century. In the early 1970s, sociopolitical unrest in America prompted a backlash against rehabilitation as a priority (Martinson 1974), and evidence was presented suggesting that rehabilitation did not work. Recent research demonstrates that many correctional treatment programs, particularly those that employ cognitive-behavioral therapies, are in fact effective in reducing impulsive aggression, antisocial behavior, and recidivism (Henwood et al. 2015; Kersten et al. 2016; Rotter and Carr 2013; Zajac 2015).

Progress has been made in developing psychopharmacological agents that have increased treatment effectiveness by targeting specific risk factors, includ-

ing impulsivity, attention deficits, and underlying psychiatric disorders associated with increased risk of violence (Comai et al. 2012). A growing body of empirical evidence supports the efficacy of the use of antipsychotics for disruptive behavior disorders (Gorman et al. 2015; Henwood et al. 2015; Ipser and Stein 2007) and psychotic disorders, as well as the use of stimulants for conduct disorder and attention-deficit/hyperactivity disorder (Lichtenstein et al. 2012). Promising results have also demonstrated the efficacy of mood stabilizers (Pappadopulos et al. 2006).

In adults with impulsive aggression, treatment with selective serotonin reuptake inhibitors has been found to increase glucose metabolism in the orbitofrontal cortex, suggesting a potential method for improving functioning in brain regions that have been identified as deficient in antisocial populations (Glenn and Raine 2014). Although some research efforts persist in the field of pharmacology of impulsive aggression, notably targeting the serotonergic system, no pharmacological intervention that specifically targets impulsive aggression currently exists (Olivier and van Oorschot 2005). Nevertheless, the broader area of psychopharmacology research regarding medications that may decrease the incidence of offensive behavior is of critical importance and is being vigorously pursued (Umukoro et al. 2013).

Given the heterogeneity of offenders in the United States, developing a unified intervention strategy for all offenders is implausible. However, personalized approaches that target specific components of and motivations for antisocial behavior are emerging as potential interventions for crime prevention. The next steps in research on effective interventions in forensic psychiatry must take a multidimensional approach that considers the individual's environment, predispositions, and biological factors to determine mechanisms of behavior change.

Evolving Ethical Standards

A variety of codes and reports have helped shape the foundation for the ethical conduct of forensic psychiatric research and the ethical principles that guide clinical research with human subjects. The modern history of human subject protections began with the Nuremberg Trials, which exposed the atrocities of Nazi human experimentation during World War II and prompted the creation of the Nuremberg Code in 1949. The three basic elements of the Nuremberg Code—1) voluntary and informed consent, 2) a favorable risk-to-benefit analysis, and 3) the right to withdraw from research without repercussion—became the foundation for subsequent ethics codes and federal research regulations. Despite playing an integral role in the creation of the Nuremberg Code, U.S. federal regulation of research at that time was minimal.

The U.S. government's role in regulating research on human subjects changed following several highly publicized controversies. For example, in 1972, the public learned about the Tuskegee experiment, a 40-year research study in which the U.S. government withheld adequate treatment from a group of poor African American men with syphilis. The publicity about abuses of the rights of vulnerable people spurred reform in human subject regulations and the governing bodies that oversaw those regulations.

In the aftermath of these profound breaches of research ethics, the Policies for the Protection of Human Subjects were adopted in 1974 as official government regulations (Cislo and Trestman

2013). The U.S. National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research was formed the same year and in 1978 published "The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research" (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research 1978).

The recommendations proposed in the Belmont Report formed the basis of the Common Rule, the current U.S. federal regulations for protection of human subjects in research, codified in 1991 in the Code of Federal Regulations (45 CFR 46, 2005) (U.S. Department of Health and Human Services 1991). The Common Rule outlines requirements for human subject research and for research institutions to assure compliance, such as the requirements for institutional review boards (IRBs). Since the Common Rule was first codified, protections have been added for three populations deemed especially vulnerable to ethical lapses in research practices: pregnant women and fetuses (1975), prisoners (1978), and children (1991). A vulnerable population is one that has diminished autonomy.

Although federal regulation of permitted and proscribed research behavior is necessary to protect human rights, the Common Rule has not been without unintended consequences and controversy. For example, the Institute of Medicine considers prisoners an understudied population in many critical areas (Gostin et al. 2007). However, due to the complexities and ethical prohibitions regarding human research, especially in a federally defined vulnerable population, progress implementing research with this population has been slow.

One of the most significant aspects of the Common Rule is the mandate that all research proposals involving human subjects be reviewed by an IRB. Effective IRBs are critical components of all successful modern research organizations. Each institution's IRB has the responsibility for protecting human subjects of research, training investigators, and reviewing research proposals. Each IRB must develop policies, procedures, and membership consistent with the guidelines delineated in the Common Rule. A large element of research proposal review is affirming that the informed consent process and the informed consent form meet all regulatory standards. Data safety, adverse event monitoring, and periodic review are also components of IRB functioning (Enfield and Truwit 2008).

Whether a study requires IRB approval depends on whether it involves ongoing practice or actual research. In the Belmont Report, the National Commission defines *practice* as "interventions that are designed solely to enhance the well-being of an individual patient or client and that have a reasonable expectation of success" (Belmont Report, Section A). In contrast, the commission defines *research* as "an activity designed to test a hypothesis, permit conclusions to be drawn, and thereby to develop or contribute to generalizable knowledge" (Belmont Report, Section A). Projects that fit the commission's definition of practice are not considered human subject research and do not require IRB approval.

Three ethical principles inform the work of an institution's IRB: 1) respect for persons, 2) beneficence, and 3) justice. The principle of *respect for persons* incorporates two components related to individual autonomy: each individual has the right to self-determination, and "vulnerable" persons with diminished autonomy are entitled to additional protection to prevent exploitation. Four ethical research requirements follow directly from the principle of respect for persons:

1. Participants must voluntarily consent to participate in research.
2. The consent must be informed.
3. Privacy and confidentiality must be protected.
4. The participant has the right to withdraw from research participation without penalty or repercussions.

Informed consent is perhaps the most widely recognized ethical safeguard in clinical care and research. Informed consent consists of three key elements: voluntariness, disclosure, and capacity (Dyer and Bloch 1987). The landmark case of ***Kaimowitz v. Michigan Dept. of Mental Health*** (1973) highlighted the importance of these elements. The ***Kaimowitz*** decision emphasized that informed consent has to be based on the disclosure of appropriate information to a competent subject who is in a position to make a voluntary choice. The principal issue before the ***Kaimowitz*** court was whether an involuntarily detained psychiatric patient could render valid consent to psychosurgery. The court reasoned that because of a patient's "mental condition, the deprivation stemming from involuntary confinement, and the effects of the phenomenon of 'institutionalization,'" the patient's ability to render informed consent is seriously undermined. The court concluded that the coercive environment of the mental institution precludes mental patients from reasoning as equals with their doctors and that this "inherent inequality" renders it impossible for the patient to give a truly voluntary informed consent. The ***Kaimowitz*** court also concluded that because the effects of psychosurgery are so uncertain, "knowledgeable consent to psychosurgery [is] literally impossible."

Beneficence, the second ethical principle for IRBs, requires that researchers strive to maximize benefit and minimize harm to subjects. In other words, the risks of the research must be justified by the potential benefits to the individual, society, or both.

Finally, the principle of *justice* addresses equal distribution of both benefits and burdens of research and underlies the additional regulatory protections for vulnerable populations. Participant selection must be fair on an individual level, and researchers may not show favoritism when selecting research subjects. Selection must also be fair at the group level, and federal regulations protect certain vulnerable populations—that is, pregnant women, prisoners, and children—from being used as convenient samples. Other vulnerable populations not formally protected by the Common Rule, such as minorities, the poor, and institutionalized individuals, may also be at risk of improper selection for research studies.

Current Directions in Research Domains

Causation

The pervasiveness of antisocial behavior highlights the importance of identifying specific factors etiologically related to the onset and maintenance of such behaviors. Substantial progress in understanding these etiological factors has been made in a variety of disciplines, including the natural, social, and behavioral sciences. Increasingly, research in these fields documents the influence of neural, genetic, and environmental factors on broad classes of antisocial behavior. Across these studies, factors such as dysfunction in the anterior cingulate cortex, exposure to violence, community disadvantage, repeated engagement in the same behavior, and demographic factors such as age and sex ap-

pear to be important predictors. Other factors also differentiate subtypes of antisocial behaviors and disorders; these factors include specific genotypes, activation in the amygdala, familial interactions, peer relationships, trait impulsivity, and substance abuse (Baskin-Sommers 2016).

Nonetheless, research examining etiological factors across neuroanatomical, neurophysiological, developmental, social, and epigenetic domains is needed. Designing research to identify specific etiological factors at multiple levels of analysis could facilitate the identification of variables that need to be controlled for or addressed in risk prediction and the development of interventions that are increasingly more efficacious.

Prediction

Understanding or predicting human behavior is extraordinarily difficult, and forensic examination in civil or criminal settings continues to be an area of expanding research. One challenge to understanding or predicting crime is the complexity and heterogeneity of criminal behaviors and the people who engage in them. To date, behavioral factors have been the focus of prediction models. However, using biological markers as predictors holds great potential. For example, Aharoni et al. (2013) found that error-related brain activity, thought to be related to anterior cingulate cortex activity, elicited during performance of an inhibitory task predicted subsequent rearrests among adult offenders, beyond other risk factors (e.g., age, psychopathy score, substance use). Further examination of paradigms such as this may lead to pragmatic and useful tools for predicting the risk of future behavior.

Despite some evidence that standard behavioral factors are reliable predictors of behavior and that using biological markers has some potential for predicting criminal behavior, increasing evidence indicates that chronic antisocial behavior is due not to one dysfunction but more likely to an interaction among multiple deficits and domains. Thus, for prediction methods to be more valuable, they must take into account the complexity of such behavior and the many factors that influence the onset and maintenance of this behavior.

For example, studies in individuals with schizophrenia (Kubicki et al. 2011) and Alzheimer's disease (Wolz et al. 2011) found that combining brain measures from different units of analysis into a single (weighted) value predicted disorder-specific symptoms more reliably than any of the individual measures. Therefore, prediction models should begin to take into account the influence of multiple factors that span biological and behavioral levels of analysis. Identifying convergence and unique relationships among predictors across levels of analysis, from biological to behavioral, will allow evaluation of the validity of each predictor and assess whether combining information across units of analysis strengthens the predictive power of determining violent or aggressive behavior.

The use of model-based assays to characterize subgroups of individuals by differences in multiple factors and mechanisms provides an opportunity to pursue formal differential diagnoses and profiles. Several relatively inexpensive tools are already available to measure brain activity (e.g., electrophysiology) or well-validated behavioral tasks that tap underlying brain function (e.g., measures of inhibitory control). These measures, combined with traditional risk factors, such as psychopathology (e.g., psychopathy), age, and environment might, for example, be implemented as part of routine risk assessment for parole.

Additionally, once the field of forensic psychiatry identifies specific measures that are representative of key predictive factors, statistical models can be developed (and run in standard programs) to provide a discrete risk propensity for a specific individual (Monahan et al. 2000; Stephan and Mathys 2014). These statistical programs have the potential to accept fields of data that would seem no different to the user than the typical risk assessment programs currently in use. No predictive assessment tool or model is going to be perfect, and the likelihood that a single measure will provide enough sensitivity and specificity for reliably predicting future behavior is slim. Therefore, the future of forensic prediction lies in assessing and modeling multiple factors and their interactions.

Intervention

Psychotherapeutic efforts to reduce the risk of aggressive, violent, or predatory behaviors that might lead to justice involvement are increasing. Early evidence from several psychotherapeutic interventions and benign brain manipulations (e.g., cognitive remediation) indicate some progress toward the goal of reducing or eliminating offensive behaviors. Extensive work with children, adolescents, and their parents (Sukhodolsky et al. 2016) as well as with adults in both community (Ross et al. 2013) and correctional (Kersten et al. 2016) settings suggests that inroads are being made toward the goal of reducing or eliminating such offensive behaviors.

Although the evidence for the use of psychotherapeutic interventions is strong, these therapeutic programs often fail to target specific cognitive-affective deficiencies associated with subtypes of antisocial behavior. Interest in understanding the mechanisms of behavior change and developing effective treatments that capitalize on this understanding has been increasing during the past decade. Cognitive remediation, a particularly promising and innovative treatment strategy, attempts to train individuals in the specific cognitive skills identified as deficient in various forms of psychopathology. *Cognitive remediation* is specifically designed to target cognitive-affective dysfunctions for offense subtypes; its application has resulted in differential improvement on trained tasks and also has demonstrated generalization to nontrained tasks (Baskin-Sommers et al. 2015). Similarly, evidence suggests that training directed at specific deficits, such as empathy, through targeted interventions results in durable behavior change (Dadds et al. 2012).

Research to determine the specific moderating and mediating factors of these various interventions is still needed (Cornet et al. 2015). No single treatment alone is likely to have a profound effect on an individual's offending behavior, particularly given the heterogeneity of behaviors such as impulsive or predatory aggression and their causes. However, existing research has provided hope that combining psychosocial treatments with targeted biological interventions will lead to improved efficacy of treatment and to the decrease of behaviors that, when related to mental illness, can result in arrest and incarceration.

Conclusion

Research in forensic psychiatry has been shaped by many factors over the past decades. Court decisions and legislative regulations place demands on the nature, quality, and scope of research that may be conducted. Psychometric research, behavioral studies, psychopharmacol-

ogy, and neuroscience are all elements of this rapidly evolving domain. Although the body of forensic psychiatric research is growing, it remains limited by the relatively small number of researchers dedicated to an enormous field. The future will certainly bring continued and rapid growth to the field and the understanding of causation, prediction, and intervention in human behavior.

Key Concepts

- The complexity and heterogeneity of antisocial behaviors and the people who engage in them present a challenge to understanding or predicting the behaviors or recidivism rates.
- The ***Kaimowitz*** decision emphasized that to be legally and morally valid, informed consent must be based on the disclosure of appropriate information to a competent subject who is in a position to make voluntary choice.
- The Belmont Report includes three ethical principles that inform the work of any institutional review board: 1) respect for persons, 2) beneficence, and 3) justice.
- The Common Rule is a federal policy regarding human subject protection that outlines requirements for assuring compliance by research institutions; for researchers' obtaining and documenting informed consent; and for institutional review board membership, function, operations, review of research, and record keeping.
- Research that can improve understanding of antisocial behaviors, assessing of future risk, and designing of interventions to decrease risk of engaging in antisocial behaviors must take into account the influence of multiple factors that span biological and behavioral levels of analysis.

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