COMMENTARY

Ethics Challenges for Presenting Genetic Data in Forensic Settings

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Advances in psychiatric science and technology such as genetic testing hold great promise in enhancing care in treatment settings and improving truth-telling in forensic settings. Despite this promise, these emerging technological advances present considerable ethics dilemmas to forensic practitioners because of risks related to coercing evaluees to consent to testing, and not adequately informing people of forensic risks associated with these tests, as well as important prejudicial effects (e.g., the significance of the tests being overvalued by the trier of fact and introducing racial and socioeconomic biases). Ethics theories from Stone, Appelbaum, Griffith, Norko, as well as Weinstock and Darby, are reviewed and applied to the specific challenge of presenting genetic data in parental rights termination proceedings. Dialectical principlism is utilized as a framework to analyze the competing duty considerations in these situations to help guide ethics-based decision-making for forensic experts in these scenarios.

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Applying psychiatric genetic evidence in court proceedings to terminate parental rights raises significant ethics questions. In their study, Sabatello and colleagues[1] examined whether the introduction of genetic information that a child was predisposed to general anxiety disorder (GAD) would influence respondents' decisions to terminate parental rights for a poor, unemployed, single mother on welfare. In the study scenario presented, the mother had previously relinquished custody to the Department of Social Services (DSS) but now desired to regain custody over the DSS's objection that the mother was not able to provide a stable and supportive environment. The results from the nationally representative sample of adults from the general public ($n = 300$) found that genetics alone did not lead to significantly different decisions regarding parental rights termination; however, participants who were presented with evidence of a child's genetic predisposition for GAD were significantly more likely to terminate parental rights for the parent when the child was asymptomatic. One possible explanation for this finding is that respondents may be more convinced, considering gene-environment interactions, that a foster parent with more resources would better be able to mitigate the child's risk for developing GAD relative to the biological mother, who is impoverished. This is consistent with evidence that a nexus exists between parental poverty and terminating parental rights, despite this not being permissible legally.[2] The possibility for facilitating such discrimination with the introduction of genetic testing as suggested by this important study raises the major question of whether a forensic psychiatrist ethically can present psychiatric genetic evidence in these court proceedings, given that the application of genetic information in these contexts is so fraught with problems. If utilizing genetic tests in such proceedings is not absolutely unethical, then forensic psychiatrists must navigate the related ethics landmines that threaten to distort science and truth or violate a person's humanity. Before addressing the competing ethics considerations specific to the dilemmas underscored by the study by Sabatello *et al.*,[1] I will first examine special questions related to applying novel neuroscientific tools in forensic contexts and describe the broader historical progression of forensic ethics

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theories that provide the foundation for further analysis.

Ethics Concerns for Neuroscience Tools

Advances in psychiatric science and technology (e.g., neuroimaging, psychiatric genetics, artificial intelligence, among others) hold great promise in enhancing our field's understanding of pathophysiology, ability to diagnose diseases accurately, stratify risk for various diseases and health outcomes, and effectively treat illnesses. Despite this promise, these emerging technological advances present significant ethics dilemmas, medico-legal limitations, and risk for misuse in forensic settings.[3] These novel scientific tools are primarily designed and developed to help patients in the treatment setting, where the primary goal is to advance patient welfare. Ethics challenges arise, however, whenever these new tests and technologies are applied outside of the intended treatment domain in settings that have separate and conflicting goals.

Neuroimaging and genetic evidence are increasingly being introduced in judicial proceedings,[4–9] and the related ethics concerns of using such evidence in legal settings are similar. Presenting neuroimaging and genetic tests in forensic contexts can elicit what Weisberg and colleagues[10] refer to as the "seductive allure" of neuroscience that may lead the triers of fact to mistakenly overvalue its significance despite that the interpretation is not supported by the current scientific evidence. For example, the presence of neuroimaging without any additional information has been found to make scientific claims more convincing,[11] and genetic attributions for psychiatric disorders have been found to elevate the disorders' perceived severity, chronicity, and refractoriness to treatment.[12,13] Furthermore, neuroimaging can undergo computer processing to be made even more visually persuasive to the trier of fact, a technique pejoratively referred to as "dial-a-defect," which leads to even greater concerns of prejudicial effects.[14,15] Thus, careful reflection of the utility of presenting neuroimaging and genetic test information is needed when writing forensic reports or giving oral testimony. Emphasizing the importance of the tests or in certain circumstances even presenting the results is unethical when doing so is likely to mislead the trier of fact or be a distractor obscuring the truth (e.g., when the data are irrelevant to the psycholegal question at hand).

The primary goal in forensic psychiatry (i.e., advancing the ascertainment of truth on psycholegal questions to facilitate justice) differs and often is in direct conflict with the goals of treatment psychiatry (i.e., advancing the person's welfare). Thus, the utilization of novel "predictive" tests outside of treatment settings is especially problematic. For example, persons at risk for Huntington disease may opt not to have genetic testing, or persons at risk for Alzheimer disease may choose not to have laboratory testing for biomarkers or neuroimaging that could be used to stratify their risk for progression to dementia. It is foreseeable, however, that similar persons in a forensic setting may face consequences for not complying with such testing and that the medical information obtained under that pressure could be used against them in the legal matter.

Finding a genotype conferring risk for disease and discovering structural brain defects or lesions on neuroimaging during a forensic evaluation places the expert in a precarious position. Not only may the evaluee not want to know about the presence of a brain abnormality, but also there could be significant genetic implications for children, siblings, and other family members. It remains unsettled whether courts may compel neuroimaging or genetic testing without a defendant's consent; however, forensic psychiatrists may for ethics reasons decide not to perform these tests or use the information in such scenarios to avoid being complicit in violating a person's humanity.

In addition to these concerns of coercion, which would violate the forensic principle of respect for persons, concerns for patient autonomy related to informed consent in the treatment setting also become significant. That is, the results of laboratory tests (including genetic tests), neuroimaging, and other studies that a person may elect to have in treatment settings could be used against them in forensic situations despite the fact that the person would have been unaware and not informed of potential forensic ramifications (i.e., it is unlikely that a treating physician would advise patients about legal risks when obtaining informed consent for these medical tests). It is also possible that being informed of these risks would have altered the patient's decision to have the test. This would apply to individuals making decisions for themselves as well as to parents making medical decisions for their children. Despite some safeguards in the Genetic Information Nondiscrimination Act of 2008 (GINA), which was passed to prevent employers from discriminating against a worker's present capacity to work on the basis of genetic information (Title II of GINA prohibits covered entities, including employers and insurance companies, from using genetic information in their decision-making processes), concern may still exist about how this information may be used in ways that can lead to deleterious effects outside of the particular legal question being litigated.

Stone's Ethics Challenges and Responses

Although introducing neuroimaging and psychiatric genetics in forensic contexts represent relatively new ethics nuances, the dilemmas raised are similar in theme to ones described closer to when AAPL was founded. In 1982, Stone[16] challenged forensic psychiatrists to grapple with four major questions:

> Does psychiatry have anything truthful and relevant to say to the courts?
> Is one twisting justice to help the evaluee?
> Is one deceiving the evaluee in order to serve justice?
> Is one prostituting the profession by becoming an advocate?

Appelbaum[17,18] addressed Stone's questions for forensic psychiatry by distilling two primary principles: truth-telling (i.e., to include both subjective and objective truth-telling) and respect for persons (i.e., to respect the humanity of the person being evaluated and not to engage in deception, exploitation, or needless invasion of privacy). Griffith[19,20] observed that a "culture-free" model of forensic psychiatric ethics would fall short in maximizing objective truth-telling and respect for persons, and he proposed his cultural formulation and narrative approaches as solutions to this oversight. Norko[21,22] described the importance of presence, empathy, compassion, and centering to elevate the search for truth from a mechanical to a spiritual exercise. Weinstock and Darby developed dialectical principlism as a model that prioritizes duties according to role, integrating compassion, narrative, principlism, and other approaches to help psychiatrists identify, weigh, and balance the competing considerations that guide ethical decision-making for a given situation.[23–24]

Applying Stone's[16] questions to neuroimaging and genetic testing, two main considerations are framed. The first is whether neuroimaging and psychiatric genetics have probative value in the courtroom, and, if so, whether experts are able to minimize potential distortion and prejudicial effects. These could reflect a seduction into becoming an advocate that unfairly benefits the evaluee (e.g., overstating the significance of an abnormality on neuroimaging to reason that a person was not culpable for a crime). Alternatively, experts could advocate in a way that hurts the evaluee (e.g., distorting the significance of a genetic test that indicates a predisposition for Alzheimers dementia to argue that a person currently lacks contractual capacity), depending on the side that retains the expert. Adding Appelbaum's[17,18] principlism approach elucidates the importance of experts, maximizing objective truth-telling as well as controlling against a violation of necessary respect for persons. Incorporating Griffith's[19,20] cultural formulation and Norko's[21,22] compassion emphasis, the need to consider an individual's narrative within and not divorced from that person's cultural context is critical to prevent biased opinions that would unjustly harm African-American and other nondominant groups. Finally, Weinstock and Darby's[23,24] dialectical principlism organizes the relevant competing ethics considerations by role-dependent priorities (Table 1) and then weighs them on the basis of the particular contextual factors taken from the narrative.

Applying Dialectical Principlism

When considering the ethics of presenting genetic evidence in parental termination proceedings, it is helpful first to identify the relevant ethics considerations and determine whether they conflict with one another. In the example of determining whether to provide genetic evidence for the child in a parental termination proceeding, the primary forensic ethics principles of truth-telling and respect for persons, as articulated by Appelbaum,[17,18] clash with one another. Griffith's[19,20] and Norko's[21,22] theories highlight the need for cultural considerations and compassion for the evaluee (i.e., the mother) on the basis of her unique narrative; they recognize that merely being vigilant not to deceive or exploit an evaluee in the quest for truth may not be a sufficient protection in certain contexts and they encourage experts to venture beyond rigid and narrow conceptions of the singular duty to just answer the psycholegal question without regard for the ramifications. I will apply dialectical principlism as a method that encompasses these theories and strives to weigh and balance competing obligations depending on variables from the specific context and narrative to help frame approaches for psychiatrists to make informed, ethics-based decisions when encountering such dilemmas.[23,24]

Table 1 Duties of a Physician Working in Different Roles as Described by Dialectical Principlism

	Forensic Role	Treatment Role	Research Role	Managed Care Role
Primary duties	Advancing justice via: Truth-telling Respect for persons	Advancing patient welfare via: Respecting autonomy Beneficence Nonmaleficence	Advancing scientific knowledge	Appropriate allocation of resources
Secondary duties	Consideration of the evaluee's welfare Consideration of the retaining attorney's case Consideration of societal expectations for physicians Consideration of personal values	Consideration of societal welfare via: Protecting vulnerable third parties Distributive justice	Safety and health of research subjects	Welfare of the patient receiving care

In the forensic role, the societal good of advancing justice is achieved via the truth-telling principle. In this specific situation, however, it is unclear whether the probative value of the genetic test would exceed prejudicial effects sufficiently to warrant its inclusion. The first hurdle would be to define the variables necessary for the expert to believe the probative value outweighed prejudicial concerns regarding genetic tests. If that is possible, then the next step would be to balance the truth-telling principle (i.e., opining on what is in the child's best interests on the basis of the child's genetic vulnerability) against the principle of respect for persons. That is, pressuring (implicitly or otherwise) the mother to consent to her child having genetic testing for this forensic purpose would violate the respect for persons principle that would favor not coercing the mother to consent to such testing. Similarly, if the genetic testing had already been performed in the treatment setting, the forensic expert would need to consider the ethics harm in violating the mother's autonomy if the mother was not previously informed of this potential forensic risk (of the data being used against her later to terminate her parental rights) or did not understand this warning adequately. Although the expert does not have a doctor–patient relationship with the evaluee, dialectical principlism would characterize the autonomy consideration as a secondary duty. In certain contexts that secondary duty could outweigh the primary truth-telling principle in a similar balance as respect for persons.

Variables Affecting Probative Value

To address the primary concern related to the truth-telling principle, I return to Stone's first question of whether we have anything of truth and relevance to say in court. In the specific case of parental termination proceedings, we must consider whether a child's predisposition or vulnerability for a mental illness should ever be grounds for rationalizing the termination of parental rights (i.e., whether a child's genetic tests are sufficiently relevant and probative to an opinion regarding parental fitness or instead serve as an irrelevant distraction that obscures more important information). If genetic tests for psychiatric diseases are deemed relevant in these termination proceedings, then it stands to reason that we make a similar judgment for other nonpsychiatric heritable illnesses that are also known to have significant gene-environment interactions such as abdominal obesity, dyslipidemia, hypertension, heart disease, diabetes, and stroke, which may play more important roles in determining expected quality-adjusted life years relative to psychiatric disorders.

To foster truth, an expert must adhere to both subjective truth-telling (i.e., being honest) and objective truth-telling components.[17,18] While subjective truth is relatively straightforward (e.g., experts should not lie or distort their opinions), objective truth-telling requires that psychiatrists are competent, have expertise in the areas in which they opine, review relevant sources of information (including collateral interviews when appropriate), perform adequate evaluations, base opinions on evidence, apply evidence-based science, and qualify limitations of their opinions (e.g., treatment records that were lost when the evaluee's psychiatrist died, reliability and validity measures for applied studies, lack of access to interview collaterals, to name a few). Additionally, I would argue that experts need to consider the balance of probative and prejudicial effects when determining whether to include certain evidence that supports their opinion. While this may be difficult to predict in certain situations, other times it may be clear enough that a piece of information is much more likely to be prejudicial than probative to warrant not performing the test or conveying the results.

Although it is not a given that genetic vulnerability is a legitimate probative factor, there are several variables that would likely increase or decrease the relative probative value of such tests. One question to consider is whether the psychiatric conditions being tested are considered severe enough as to be probative in these proceedings. For example, most experts would likely agree that a genetic risk for a more debilitating disorder such as schizophrenia or bipolar disorder in the child would be more important than a genetic predisposition for GAD or premenstrual dysphoric disorder. Also, the particular risk conferred would be a factor in the determination as well as the type of genetic test. For example, a test for a single gene that is 100 percent penetrant for a psychiatric disorder is very different from a genetic test that looks for changes in a number of genes that may confer a risk of 20 to 30 percent (or even lower) for a particular psychiatric disorder. Not only is the former genetic test potentially more probative to the ultimate question, but it is much easier to convey to triers of fact (who are laypersons and may lack a strong scientific background) than the latter, more complicated genetic test that deals with a trait that is multifactorial. And most biological traits are multifactorial (i.e., influenced by many genes, environmental conditions, and epigenetic expression), and only a statistical measure of association is possible with these polygenic traits. Thus, the strongest hypothetical situation to favor inclusion of a genetic test would be one that tests for the most serious and debilitating psychiatric disorders, a test that confers high likelihood of the child manifesting the disease, and a test that is likely to be relatively easier understood and less likely to be misinterpreted by laypersons.

In the study by Sabatello *et al.*,[1] respondents were significantly more likely to render a termination of parental rights when the child had a genetic predisposition of GAD but had not manifested clinical symptoms. This raises the question of whether laypeople consider the stress of the child's being raised by a poor mother as potentially increasing the likelihood of the child later developing GAD, and perceive this stress and its subsequent effects on gene expression as more significant than the stress related to a child being removed from her biological parent. Forensic psychiatrists would likely see more probative value in presenting genetic tests that represent high-risk associations with the most debilitating psychiatric illnesses in order to opine that enhanced parental support is especially warranted in the care of the child's illness. Laypeople, on the other hand, may be influenced more when they believe that any genetic vulnerability exists, regardless of how small the risk or minor the likely functional impairment will be. That is, laypeople may be more ready than experts to believe any genetic risk for any psychiatric disorder justifies that the child have the most robust support available to prevent the illness from manifesting.

Variables Affecting Prejudicial Effects

As noted earlier, applying genetic testing in forensic settings risks misleading the trier of fact with its significance as laypersons may lack the relevant scientific training to understand its meaning and relevance to the ultimate question. To strive to be as objective as possible, forensic psychiatrists must be careful in how such results are presented and should only present genetic tests when they have sufficient expertise in being able to qualify the limitations and explain the nuances of these tests properly (e.g., penetrance, epigenetic factors, etc.) to avoid misstating or distorting the scientific truth. It is crucial that psychiatrists do not go beyond the scope of their expertise in presenting this information. Thus, the prejudicial effects are mitigated when forensic psychiatrists are more competent in their understanding of the limits of the genetic testing as well as their ability to communicate the findings with ample care not to distort its relevance and significance.

A major problem in using a child's medical or psychiatric problems as the basis for opining that parental rights should be terminated is that it creates a higher bar for poor parents to prove they have adequate parenting skills versus those who have more resources. Sabatello *et al.*[1] reported that, while most survey participants did not terminate parental rights altogether, they would not have returned the child to the mother's home; although the authors were not able to capture the rationale for these decisions, they raised the possibility that it was due to stigma and bias regarding poor parents' being less able to care for their children. It is unclear why survey respondents were significantly more likely to terminate parental rights when provided with the evidence that the child had a genetic risk for GAD and that it was unlikely the child currently had GAD, but one hypothesis is that participants weighed the stress of being raised by a poor mother as more significant when there was a genetic risk for developing GAD. Respondents may be primed by genetic evidence to overestimate the potential benefits of foster parents with greater resources. That is, they may wrongly believe that such foster parents are better able to prevent the development of a psychiatric disorder and underestimate the traumatic harm caused by the removal of a child from her biological mother. This effect evaporated when the participants believed it was likely that the child already had GAD, which suggests that they may have perceived less benefit in having the child raised by foster parents with more resources once the damage was already done (i.e., the role of nurture mattered less to participants once the child has the disease).

Thus, it could be more prejudicial than probative to report genetic tests that are not relevant to an individual parent's ability or fitness to raise a child. It could also lead to discrimination as minorities are disproportionately economically disadvantaged and face barriers to accessing adequate health care because of structural and systemic racism; that is, they would be unfairly penalized in such an analysis. Further, nondominant groups may be more likely to be perceived as having fewer resources, regardless of whether that is actually the case. These problems are further compounded when we utilize predictive tests for conditions that may or may not materialize.

Despite the study by Sabatello *et al.*[1] that did not find statistically significant differences in termination decisions on the basis of the mother's race (i.e., African American versus white), socioeconomic and racial variables should affect how experts weigh the expected prejudicial effects of presenting genetic information. When the parent is an affluent white person, there is likely a reduced probability that disclosing the genetic test would have as great of a deleterious impact on judging whether that person is a fit parent than if the parent were poor or a person of color. More research is needed to explore potential priming effects for racial and socioeconomic bias when introducing genetic tests or other medical information. It would be an ethics error to ignore this cultural context and the likely influence that it would have on the trier of fact. Prejudices can lead to unjust findings even if the data are fairly presented. It may not be easy to determine the effect of such factors, but experts should make the attempt. Understanding the potential prejudicial effects that are based on these and other factors is important in the ethics calculus. And if the expert determines that the expected prejudicial effects outweigh the probative value, then the genetic information should not be introduced.

Variables Affecting Respect for Persons

Finally, situations in which a person is offered the choice to obtain genetic testing after being informed of the forensic implications will be balanced differently than those situations in which a person is coerced or not advised of the possible ramifications. Also, if it is not ethical to compel or coerce parents to have their children tested for various conditions in such legal proceedings, then it would similarly be unethical to use genetic tests that were obtained by parents in treatment contexts when they had no advisement that it could be used to terminate their parental rights (i.e., when no informed consent on potential legal risks for the genetic test were provided to patients, and they thus did not fully appreciate the risks of the testing). These risks of violating the principle of respect for persons are greater when the expert is retained by the side opposing the parent, but these risks also can exist in scenarios when the expert is court-appointed or retained by the parent. For example, as the study by Sabatello *et al.*[1] illuminates, the introduction of genetic information can lead to surprising results and consequences that may be hard to predict, even by the parent's retained expert. It is possible that introducing genetic testing is a double-edged sword that could either help or hurt the parent's case for retaining parental rights, so the parent's retained expert should be fully aware of this risk when informing the evaluee and evaluee's attorney about the possible prejudicial effects of such testing, even when it is being used to support an opinion in favor of retaining parental rights. That is, these situations require the expert to not skip over or minimize these potential risks when obtaining fully informed consent.

Balancing the Competing Principles

This framework helps experts understand the contextual variables that would modify the relevant weights assigned to these ethics duties. I would argue that if the parent had either been coerced to have genetic testing for this forensic purpose or this information was taken from the treatment setting without adequate informed consent on this legal consequence, this alone outweighs the truth-telling principle. In such a situation, I would favor not applying the genetic test. If the mother had decided voluntarily to authorize the genetic test, knowing of this potential forensic ramification, then I still would consider whether the prejudicial concerns are outweighed by the probative value of the test. Examples of when the truth-telling principle may favor inclusion of genetic testing in such a scenario would be when there is less concern for racial or socioeconomic discrimination and when the test is of especially high probative value given the variables described earlier. Ultimately, whether certain contextual factors may favor using a particular genetic test in a parental termination proceeding on ethics grounds will be up for debate. Forensic psychiatrists may have differing thresholds in how they assign weight to these competing duties on the basis of individual differences (e.g., whether experts view themselves more as physicians in a forensic role versus scientists in a forensic role).

Conclusion

The American Academy of Psychiatry and the Law Ethics Guidelines for the Practice of Forensic Psychiatry state, "When psychiatrists function as experts within the legal process, they should adhere to the principle of honesty and should strive for objectivity" (Ref. 25, Section IV). Forensic psychiatrists gather data by reviewing relevant medical and psychiatric records, obtaining relevant collateral information, performing psychiatric evaluations, and ordering and reviewing relevant testing (e.g., psychological testing, labs, neuroimaging, etc.).[26] Psychiatrists practicing in a forensic role enhance the honesty and objectivity of their work by basing their forensic opinions on all available data, qualifying the limitations of their data, and not distorting or misrepresenting the data.[25] It is also important to know what is generally accepted in the field and be as current as possible on the scientific literature and emergent technologies that aid in the profession's understanding of underlying pathophysiological processes, diagnosis, monitoring, and treatment of psychiatric disorders. Understanding and communicating the limits of new technologies that hold increasing promise to aid in forensic assessments is paramount in the pursuit of being as objective and ethical as possible.

Psychiatrists should consider context when it is appropriate to introduce genetic information in court proceedings to maximize its probative value and minimize prejudicial effects. They should also consider situations in which it may violate the respect for persons principle or patient autonomy when informed consent regarding forensic ramifications was not obtained. While experts enhance the honesty and objectivity of their work by considering all the relevant data, fostering truth in forensic settings requires that experts think critically about whether studies and tests should be cited as supportive evidence for opinions when such data have the potential to be distorted or misunderstood in problematic ways. Efforts must be made to not obscure the truth or collaborate in a system that transgresses the universal ethics obligations that eclipse duties specific to the professional role.

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