

Gene–Environment Interactions in Developmental Psychopathology

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Chapter 11: Stephen J. Morse, Gene-Environment Interactions,
Criminal Responsibility, and Sentencing



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Gene–Environment Interactions, Criminal Responsibility, and Sentencing

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Imagine a defendant who has been charged with murder, the intentional homicide of a victim he was robbing with a weapon. He has a history of three previous convictions and imprisonments for armed robbery. Prior to being released from the third term, he publicly threatened to kill any future armed robbery victims who might be able to identify him. When the current victim looked our armed robber in the eye, the robber said to the victim, “You looked the wrong way at the wrong guy,” pulled the trigger, and killed the victim. (We know this because his accomplice has turned state’s evidence and, unbeknownst to the robber, there was a witness who will corroborate the accomplice’s evidence.)

This is a desperate case. Assume that a lawyer has been assigned to defend the killer and she needs to discover evidence that will help her make an argument to defeat the charges against the defendant or that will help her seek mitigation at sentencing if the defendant is convicted. The lawyer is aware of the Caspi and colleagues (2002) study and its later replications that found a vastly increased risk for criminal behavior among males who had been subject to severe abuse as children *and* who had a genetic defect that caused an monoamine oxidase A (MAOA) deficiency. The lawyer is easily able to confirm from family members, teachers, and neighbors that the robber was severely abused as a child, and a genetic analysis confirms that the robber also has the specific defect associated with increased risk for crime.

The question is whether the presence of this well-studied and mostly well-confirmed gene–environment interaction ($G \times E$) is relevant to support claims on behalf of the armed robber or the prosecution at trial or sentencing.

The case just described is not simply hypothetical. An Italian judge recently reduced a convicted murderer's sentence on the ground that the killer was predisposed to be particularly aggressive in stressful situations because he had the same MAOA deficiency studied by Caspi and colleagues (Feresin, 2009). There have also been a small number of U.S. cases in which such evidence has been introduced (Bernet, Venecak-Jones, Farahany, & Montgomery, 2007; Denno, 2009). It is seldom explained why a genetically driven predisposition justifies a sentence reduction. Various experts criticized the Italian's judge's decision. Nevertheless, the use of $G \times E$ for making decisions about criminal responsibility and sentencing will surely increase. The question for the law is what the relevance of such explanations of behavior might be. For example, does a $G \times E$ suggest that the hypothetical murder defendant has diminished culpability or enhanced dangerousness? Was the Italian judge justified in reducing the murderer's sentence based on genetic predisposition?

My task in this chapter is to consider the relevance of $G \times E$ to criminal responsibility and sentencing. I begin with a number of preliminary assumptions that will inform the analysis. I then turn to the law's view of the person, including the law's implicit psychology, and the criteria for criminal responsibility. False starts and distractions about responsibility are addressed next. This section explains in detail why arguments based on free will and causation that are rooted in scientific explanations of crime, including $G \times E$, do not have the implications for criminal responsibility that proponents often claim.

The extended discussion of the foregoing topics is necessary before one can even begin to consider the relation between $G \times E$ (or any other causal variable) to criminal responsibility and sentencing. With this necessary background in place, I then turn specifically to the relation between $G \times E$ and criminal responsibility. I next address sentencing and consider whether $G \times E$ is relevant to mitigation and aggravation. I conclude by considering briefly how knowledge of $G \times E$ might otherwise influence criminal justice policy and practice.

I claim that $G \times E$ causes of criminal behavior have no relation to current conceptions of responsibility per se, but they may be relevant to culpability if valid research discloses an association between $G \times E$ and a genuine excusing or mitigating condition. Thus, although $G \times E$ is unlikely to have a major transformative effect on responsibility doctrines and practices unless it transforms basic conceptions of human agency, it may well play an important role in the adjudication of individual cases. I also propose that G

$G \times E$ is likely to play its largest role in criminal justice at sentencing. I suggest that the same considerations governing responsibility ascriptions apply to sentencing mitigation and that the prediction of future dangerousness will be a common sentencing application for aggravation and mitigation.

PRELIMINARY ASSUMPTIONS

Genes, environments, and their interactions do not commit crimes; acting people commit crimes. We do not praise and reward or blame and punish $G \times E$; these are attitudes and actions we direct at people. Bedazzled by the newest scientific findings in behavioral genetics, neuroscience, and other rapidly advancing disciplines, we often forget this simple truth about our actual social and legal practices of praising and blaming, rewarding and punishing. Unless we cease to treat each other as acting agents, as persons, no major alteration of these practices is likely to result.

$G \times E$ raises no new issues about criminal responsibility or the prediction of future dangerousness that have not been raised previously by other alleged causal explanations for crime, such as social structural explanations, psychodynamic and behavioral psychological explanations, genetic explanations, and neuroscientific explanations. Such explanations allegedly prove the truth of determinism, but as the chapter later shows, determinism is not inconsistent with criminal responsibility. Similarly, many people think that discovery of a causal explanation, such as $G \times E$, is *per se* excusing or mitigating, but this is not the case, as the chapter also explains. Again, unless a causal explanation threatens human agency, which $G \times E$ does not purport to do, the basic structure of criminal responsibility and punishment is not likely to change substantially. $G \times E$ may affect the adjudication of individual cases and sentencing decisions, but it is unlikely to lead to major changes.

The basic questions for the law are always the same. What is the relevance of this causal information to legal doctrine and practice? Does the evidence seem to suggest the need for radical, fundamental restructuring or reform of law or for more limited, discrete reforms, if any, of particular doctrine or practices. Advocates often tend to make overclaims based on science (Morse, 2006), but experience indicates that most of what we learn suggests no major overhaul of law.

Human behavior is generally the product of immensely complex factors that include biological, psychological, and sociological variables. Human beings are fundamentally biological machines that always interact with their environments (Noe, 2009). In particular, $G \times E$ is surely part of the explanation of many and perhaps most behaviors. Although this is true, human beings are a special type of causal end product of the inter-

action between biology and environment. Our unique capacities, such as our ability to use fully developed propositional language and our ability to deliberate about what we have reason to do, have enormous moral and legal implications.

It is important to stress that responsibility is a distinguishable issue from prophylactic or rehabilitative concerns. Even if particular scientific knowledge has no bearing on responsibility, it may well have implications for the *ex ante* (i.e., before the fact) prevention of undesirable behavior, the *ex post* (i.e., after the fact) prevention of recidivism, the control of predictably dangerous people, and the promotion of desirable behavior.

Criminal responsibility and its consequences, such as whether and how much to punish a wrongdoer, are normative moral, political, and ultimately legal questions. They address how we should live together. Empirical discoveries about behavior can make profound contributions to debates about what we have reason to do, but they do not by themselves dictate any normative conclusion. On the ultimate issue of how we should live, science must fall silent because how we should live is a matter of practical and not theoretical reason (but see Harris, 2010, for a contrary argument). The issue is normative and not factual.

Finally, and with few exceptions, retribution—giving people their just deserts—is a necessary precondition for blame and punishment in the U.S. criminal justice system and it plays a role in all developed Western legal systems. Most criminal justice theorists justify punishment on mixed retributive and consequential grounds. Consequential concerns do matter to the definition of crimes and to the appropriate sentence to be imposed, but U.S. and Western criminal justice systems agree that no one should be punished unless he or she deserves it and no more than he or she deserves. Retribution is a well-recognized justification for the state infliction of pain on its citizens and it must be distinguished from revenge, with which it is often confused. Revenge is the primitive desire to hurt those who have hurt you. It usually involves anger and often includes psychological catharsis. Retribution, in contrast, is a theory of justice. There are many different accounts of retribution, but all agree that it is a good in itself to give people what they morally and legally deserve. It is not a primitive and prescientific form of human response, but a considered theory of justice. Blaming and punishing people for wronging others because they deserve such a response is the mirror image of praising and rewarding people for helping others because they deserve such a response. Accepting a retributive theory of punishment does not entail whether or how much criminals should be punished. One could be permissive or obligatory about whether retribution demands punishment, and a retributivist can be harsh or tender about how much punishment is deserved. The only basic commitment is that people should not be punished unless they deserve it and then no more than they deserve.

THE LAW'S PSYCHOLOGY AND CRIMINAL RESPONSIBILITY

The law—anyway a reification—has not explicitly adopted any psychology or concept of the person. What follows is a rational reconstruction of the criminal law's implicit psychology and concept of the person and why these are necessary if law is to make coherent sense and to serve a useful function in society.

Lawyers take the criminal law's implicit psychology for granted because there is seldom any need to identify or question it. $G \times E$ and other scientific findings may appear to call the law's psychology into question, however, so it is crucial consciously to recognize it and to understand what would be entailed if it were undermined.

Criminal law presupposes the "folk psychological" view of the person and behavior. This psychological theory causally explains behavior in part by mental states such as desires, beliefs, intentions, willings, and plans. Biological, other psychological, and sociological variables also play a role, but folk psychology considers mental states fundamental to a full explanation of human action. Human behavior cannot be adequately understood if mental state causation is completely excluded or eliminated. Lawyers, philosophers, and scientists do of course argue about the definitions of mental states and about theories of mind and action, but that does not undermine the general claim that mental states are fundamental to law. Indeed, the arguments and evidence disputants use to convince others itself presupposes the folk psychological view of the person. Brains don't convince each other; people do.

For example, the folk psychological explanation for why you are reading this chapter is, roughly, that you desire to understand the relation of $G \times E$ to criminal responsibility and sentencing, you believe that reading the chapter will help fulfill that desire, and thus you formed the intention to read it. This is a "practical" explanation rather than a deductive syllogism.

Folk psychology does not presuppose the truth of free will (which will be discussed further below), it is not dualist (although it, and ordinary speech, sound that way), it is perfectly consistent with the truth of determinism, and it presupposes no particular moral or political view. It does not presuppose that all mental states are necessarily conscious or that people go through a conscious decision-making process each time that they act. It allows for "thoughtless," automatic, and habitual actions, and for nonconscious intentions. For example, consider the behavior of putting on your undershorts in the morning. You probably have not considered which leg to put through first since you learned to dress yourself. There is no decision; the behavior is utterly automatic and habitual. This makes sense because

there is no reason to give any thought to which leg goes first. Absolutely nothing turns on this. Suppose, however, that you had good reason to put the other leg first, say, a threat to kill you if you put the usual leg through first. You would then bring this automatic behavior under the control of reason. This example is an illustration of folk psychology's presupposition that human action will at least be rationalizable by mental state explanations or that it will be responsive to reasons, including incentives, under the right conditions.

The definition of folk psychology this chapter uses does not depend on the truth of any particular bit of folk wisdom about how people are motivated, feel, or act. Any of these bits, such as that experiencing disrespect often produces anger, might turn out to be wrong after further empirical investigation. The definition insists only that human action is in part causally explained by mental states.

Consider the criteria for criminal responsibility. The prosecution must first prove the "elements" of the crime, which is simply the legal term for the criteria for criminal conduct. These elements are composed primarily of acts and mental states. All are infused with mental states. All crimes include a "voluntary" act requirement, which is defined, roughly, as an *intentional* bodily movement (or an omission in cases in which the person has a duty to act) done while the agent is in a reasonably integrated state of consciousness. Although the meaning of an intentional bodily movement is seldom specified, the best definition is a bodily movement that in principle can be understood according to the person's mental state. One can almost always ask of any act, "Why did you do that?," and expect some explicit or implicit mental explanation. If there is none even implicitly possible, it is probable that the agent's bodily movement was not an act at all. For example, reflexes and neuromuscular spasms involve bodily movements, but they are not actions because they were not intentional bodily movements and cannot respond to reasons or incentives.

With few exceptions that are themselves controversial, all crimes also require a culpable further mental state, such as purpose, knowledge, or conscious awareness that one is risking a prohibited harm (a mental state lawyers call "recklessness"). Some crimes are also defined with the mental state of negligence, which is defined as an unreasonable failure to be aware of the risk of a prohibited harm. Negligence appears to be the absence of a mental state. This is a controversial issue among legal scholars, but the best explanation for criminalizing negligence is that the failure to pay attention when the agent was creating a substantial and unjustifiable level of risk is itself a type of culpable omission. On the other hand, some scholars believe that negligence is an insufficiently culpable mental state to support criminal liability.

To make this discussion more concrete, consider the following standard definition of murder mentioned in the opening hypothetical about the homicidal armed robber: killing another human being with the intent to cause death. Any intentional killing conduct—for example, shooting, stabbing, strangling, poisoning, or bludgeoning—is sufficient to meet the act requirement as long as the agent was in a state of reasonably integrated consciousness when engaging in the killing conduct. Furthermore, the agent must engage in the conduct with the intent to cause death. If the agent lacked that intent and, say, just risked killing the victim, then the agent will not be guilty of intentional murder, but may be guilty of some other homicide crime that requires a different mental state.

Even if the prosecution is able to prove all the elements of crime, the defendant may still avoid criminal liability by successfully establishing what is called an affirmative defense of justification or excuse. In cases of justification, conduct that would otherwise be criminal is right or at least permissible under the circumstances. Self-defense is a classic example. Intentionally killing another human being is ordinarily murder, but an agent may be justified in killing if the other person is threatening the agent with wrongful, deadly force. In such cases, intentional killing is considered right or at least permissible. Note that in cases of justification, the agent is a fully responsible person.

In contrast, cases of excuse involve wrongful action performed by an agent who is not responsible. Roughly speaking, lack of rational capacity, external compulsion (e.g., acting in response to a “do-it-or-else” threat of death or grievous bodily injury), and, more controversially, lack of the capacity to control oneself (sometimes referred to as “internal compulsion”) are the basic grounds for criminal law’s doctrinal excuses. Note that in the cases of lack of rational capacity or lack of the capacity to control oneself, responsibility requires only the possession of the general capacity at the time in question, even if the agent did not exercise the capacity on that occasion. For example, acting irrationally, arationally, and foolishly are common even among people with the greatest capacity for rational conduct. Failure to exercise a capacity does not necessarily mean that one lacks that capacity. For the law, if the person is capable of exercising the capacity for rationality or self-control if there is good reason to do so—as there always is when important interests of potential victims are at stake—then the person may be held responsible even if he or she failed to exercise that capacity.

If the person lacks the relevant capacity, an excuse is warranted. Legal insanity is a classic example. Suppose a person delusionally believes that he or she is about to be killed by a secret agent and kills the suspected secret agent in what the person believes is self-defense. The person has wrongfully killed intentionally, but he or she would be excused because he or she was

not a rational agent when he or she killed. In a very real sense, the killer did not know what he or she was doing.

All affirmative defenses involve an inquiry into the person's mental state, such as the person's belief that self-defensive force was necessary or his or her lack of knowledge of what he or she was doing or that what he or she was doing was wrong.

In short, criminal responsibility is established if the prosecution can prove all the elements of the crime charged and the defendant cannot establish an affirmative defense. Criminal responsibility is defeated if the prosecution cannot prove all the elements of the crime charged or if the defendant can establish an affirmative defense. The elements and affirmative defenses all involve mental states. Of course the person's mental state is influenced by biological, psychological, and sociological variables, including $G \times E$, and knowledge of these variables may help determine what the person's mental state was. Nevertheless, the law is ultimately concerned with the person as an acting agent who has acted for reasons. The final explanatory pathway for criminal law is always folk psychological (directly or indirectly). Any relevant data from $G \times E$ or other sciences must be translated into the law's folk psychological criteria.

We will turn to the relation of $G \times E$ to criminal law's responsibility criteria below. Before doing so, however, I describe why the law's psychology must be folk psychology and will briefly discuss some false starts and distractions about responsibility.

THE INEVITABILITY OF FOLK PSYCHOLOGY IN LAW

Brief reflection should indicate that the law's psychology must be a folk psychological theory, a view of the person as a conscious (and potentially self-conscious) creature who forms and acts on intentions that are the product of the person's other mental states, such as desires, beliefs, willings, and plans. Law is primarily action guiding (Sher, 2006) and could not guide people *ex ante* and *ex post* unless people could use rules as premises in their reasoning about how they should behave. Otherwise, law as an action-guiding, normative system of rules would be useless, and perhaps incoherent. Law is a system of rules that, at the least, is meant to guide or influence behavior and thus to operate as a potential cause of behavior. As philosopher John Searle (2002) wrote:

Once we have the possibility of explaining particular forms of human behavior as following rules, we have a very rich explanatory apparatus that differs dramatically from the explanatory apparatus of the natural sciences. When we say we are following rules, we are accepting the

notion of mental causation and the attendant notions of rationality and existence of norms. . . . The content of the rule does not just describe what is happening, but plays a part in making it happen. (p. 35)

Legal rules are not simply mechanistic causes that produce “reflex” compliance, although they can certainly help to inculcate law-abiding “habits.” They operate within the domain of folk psychology. Agents are meant to and can only use these rules as potential reasons for action as they decide about what they should do. Legal rules are thus action guiding primarily because they provide an agent with good moral or prudential reasons for forbearance or action.

Unless people are capable of understanding and then using legal rules to guide their conduct, law would be powerless to affect human behavior (Shapiro, 2000). Law can directly and indirectly affect the world we inhabit only by its influence on human beings who can potentially use legal rules to guide conduct. For example, no “instinct” governs how fast a person drives on the open highway. Among the variables that explain the speed at which a person drives, the posted speed limit and the belief in the probability of suffering the consequences for exceeding it surely play a large role in the driver’s choice of speed. The law thus guides action.

Human behavior can be modified by means other than influencing deliberation, and human beings do not always deliberate before they act. Nonetheless, the law presupposes folk psychology, even when we most habitually follow the legal rules. All citizens constantly act in the “shadow of the law,” especially when criminal conduct is at stake.

The legal view of the person does not hold that people must always reason or consistently behave rationally according to some preordained, normative notion of rationality. Rather the law’s view is that people are capable of acting for reasons and are capable of minimal rationality according to predominantly conventional, socially constructed standards. The type of rationality the law requires is the ordinary person’s commonsense view of rationality, not the technical notion that might be acceptable within the disciplines of economics, philosophy, psychology, computer science, and the like.

Virtually everything for which agents deserve to be praised, blamed, rewarded, or punished is the product of mental causation, and, in principle, responsive to reason. I do not mean to imply dualism here. I am simply accepting the folk psychological view that mental states—which are fully produced by and realizable in the brain—play a genuinely causal role in explaining human behavior. Machines may cause harm, but they cannot do wrong and they cannot violate expectations about how people ought to live together. Machines do not deserve praise, blame, reward, punishment, concern, or respect because they exist or because of the results they cause.

Only people, intentional agents with the potential to act, can violate expectations of what they owe each other and only people can do wrong.

Many scientists and some philosophers of mind and action consider folk psychology to be a primitive or prescientific view of human behavior. No one, however, has even remotely suggested a replacement psychology for the law that would conceivably be practical—and law is an intensely practical enterprise. For the foreseeable future, then, the law will be based on the folk psychological model of the person and behavior, and this chapter will proceed on that premise. Until and unless scientific discoveries convince us that our view of ourselves is radically wrong—and nothing science has discovered begins to support this claim (Morse, 2008)—the basic explanatory apparatus of folk psychology will remain central. The folk psychological theory of personhood that the law implicitly adopts seems secure. As eminent philosopher of mind Jerry Fodor (1987) has written:

If commonsense intentional psychology were really to collapse, that would be, beyond comparison, the greatest intellectual catastrophe in the history of our species; if we're that wrong about the mind, then that's the wrongest we've ever been about anything. The collapse of the supernatural, for example, doesn't compare. . . . Nothing except, perhaps, our commonsense physics . . . comes as near our cognitive core as intentional explanation does. We'll be in deep, deep trouble if we have to give it up. . . . But be of good cheer; everything is going to be all right. (p. xii)

It is vital that we not lose sight of the folk psychological model lest we fall into confusion when various claims based on $G \times E$ or other causal variables are made. Once again, any $G \times E$ data or evidence must always be relevant to the law's folk psychological criteria. If $G \times E$ is to have any influence on legal decisions about criminal responsibility and sentencing, it must be almost entirely through this framework.

DISTRACTIONS AND FALSE STARTS IN CRIMINAL RESPONSIBILITY ANALYSIS

In this section of the chapter I consider the following distractions that have bedeviled attempts to understand the relation between scientific explanations for criminal behavior and criminal responsibility: the free will debate, the belief that causation is per se an excusing condition, the belief that causation by abnormal variables is per se an excusing condition, and the belief that causation is the equivalent of compulsion. Many of the arguments in this section probably will be unfamiliar to many scientists, but they are crucial to proper understanding and therefore deserve careful consideration.

The Non-Problem of Free Will in Criminal Law

There is a problem about free will, but not in criminal law (Morse, 2007). Free will, as the term is used in the philosophical debate about free will and responsibility, is not a criterion for any legal doctrine. Criminal law criteria involve questions genuinely related to responsibility, including issues concerning consciousness, the formation of mental states such as intention and knowledge, the capacity for rationality, and compulsion, but they never address the presence or absence of free will. People sometimes use “free will” loosely to refer to genuine responsibility doctrines, but this simply distracts attention from the real issues and perpetuates confusion.

The philosophical problem of free will is metaphysical and often clouds clear thinking about the foundation for criminal responsibility. Specialists in the philosophy of free will and responsibility often distinguish between freedom of action, the freedom to do as one chooses, and freedom of the will, the freedom to choose what one would prefer to choose (Kane, 2006). This chapter will subsume both under the locution “freedom of the will” or “free will.”

Roughly, the notion of free will used in the debate refers to whether an agent has the ability to cause his or her own behavior uncaused by anything else. In a phrase, the buck stops entirely with the agent. This ability is sometimes called contra-causal freedom, agent origination, metaphysical libertarianism, and other like phrases. Only a small number of philosophers adhere to this view, which has been termed a “panicky” metaphysics (P. F. Strawson, 1980, p. 80) because it is so implausible (Bok, 1998).

Even if this type of free will is not a criterion for any criminal law doctrine, many people nonetheless believe that this type of power or ability is a foundational assumption for legal responsibility and for justifying the fair imposition of blame and punishment. Thus, if people do not possess this god-like power, then doctrines and practices relating to responsibility may be entirely incoherent. But, as we shall see, contra-causal freedom is not a necessary support for current responsibility doctrines and practices.

Most philosophers and, I speculate, virtually all scientists, believe that the universe is deterministic or universally caused, or nearly so, especially above the subatomic level. There is no uncontroversial definition of determinism and we will never be able to confirm that it is true or not. As a working definition, however, let us assume, roughly, that all events have causes that operate according to the physical laws of the universe and that were themselves caused by those same laws operating on prior states of the universe in a continuous thread of causation going back to the first state. Even if this is too strong, the universe seems so sufficiently regular and lawful that rationality demands that we assume that universal causation is

approximately correct. Philosopher G. Strawson (1989) terms this assumption the "reality constraint."

It is important to understand that, for the determinist, biological causes, including interactions of biology with the environment, pose no more or less challenge to responsibility than nonbiological or social causes. As a conceptual and empirical matter, we do not necessarily have more control over psychological or social causal variables than over biological causal variables. More important, in a world of universal causation or determinism, causal mechanisms are indistinguishable in this respect and biological causation creates no greater threat to our life hopes than psychological or social causation (Richards, 2000). For purposes of the metaphysical free will debate, a cause is just a cause, whether it is biological, psychological, sociological, or astrological.

If determinism is true, the people we are and the actions we perform have been caused by a chain of causation over which we mostly had no rational control and for which we could not possibly be responsible. We do not have contra-causal freedom. How can responsibility be possible for action or for anything else in such a universe? How can it be rational and fair for criminal law to hold anyone accountable for anything, including blaming and punishing people because they allegedly deserve it?

Those who believe that responsibility is not compatible with determinism are called "incompatibilists" and adopt different conclusions depending on their view of determinism. "Libertarian" incompatibilists believe that determinism is not true for most action because we have metaphysical libertarian freedom, and therefore we are responsible. "Hard determinist" incompatibilists believe that determinism is true, deny that we have contra-causal freedom, and conclude that responsibility is impossible. "Compatibilists" believe that determinism is true, deny that contra-causal freedom is necessary for responsibility, and hold that responsibility is possible under the right conditions.

No analysis of this problem could conceivably persuade everyone. There are no decisive, analytically incontrovertible arguments to resolve the metaphysical question of the relation between determinism, libertarian free will, and responsibility. And the question is metaphysical, not scientific. Indeed, the debate is so fraught that even theorists who adopt the same general approach to the metaphysical challenge substantially disagree. Nevertheless, the view one adopts has profound consequences for legal (and moral) theory and practice.

Let us begin with hard determinist incompatibilism. (I have already rejected libertarianism as empirically implausible. The rest of the discussion will therefore focus only on hard determinist incompatibilism, which is a coherent position held by many.) Incompatibilism does not try either to explain or to justify our responsibility concepts and practices. It sim-

ply assumes that genuine responsibility is metaphysically unjustified. For example, a central incompatibilist argument is that people can be responsible only if they could have acted otherwise than they did, but if determinism is true, they could not have acted other than they did. This is sometimes called the "principle of alternate possibilities." It has generated endless disputes between incompatibilists, who believe it is flatly inconsistent with responsibility, and compatibilists, who believe that it is not inconsistent with responsibility (Wallace, 1994). Based on this principle and similar arguments, the incompatibilist claims that even if an internally coherent account of responsibility and related practices can be given, it will be a superficial basis for responsibility, which is only an illusion (Smilansky, 2000).

Incompatibilism based on any level of scientific cause, including $G \times E$, thus provides an external critique of responsibility. To see why, remember that causal determinism "goes all the way down." It applies to all people, to all events. Thus, if determinism is true and is inconsistent with responsibility, then no one can ever be really responsible for anything and responsibility attributions cannot properly justify further action. But Western theories of morality and the law do hold some people responsible and excuse others, and the law responds accordingly. And when we do excuse, it is not because there has been a little local determinism at work. For example, young children are not considered fully responsible because they are incapable of recognizing and of properly weighing the right reasons for action and forbearance, not because they are determined creatures but adults are not. Determinism does not loosen its grip on us as we age.

The question, then, is whether as rational agents we must swallow our pride, accept incompatibilism because it is so self-evidently true, and somehow transform the legal system accordingly into a system that abandons desert and relies on a prediction and prevention model of social control that is untethered from considerations of genuine responsibility. Such systems have been proposed (e.g., Wootton, 1963), but they have been criticized for their harsh and potentially inhumane implications that profoundly threaten liberty and dignity (Hart, 1968; Lewis, 1953). Once again, until scientific explanations, whether from $G \times E$ or others, convinces us that we are not acting agents, such a system is exceptionally unlikely to gain assent.

Compatibilists, who agree with hard determinist incompatibilists that determinism is true, have three basic answers to the incompatibilist challenge. First, they claim that responsibility attribution and related practices are human activities constructed by us for good reason and that they need not conform to any ultimate metaphysical facts about genuine or "ultimate" responsibility. Indeed, some compatibilists deny that conforming to ultimate metaphysical facts is even a coherent goal in this context. Second,

compatibilism holds that our positive doctrines of responsibility are fully consistent with determinism. Third, compatibilists believe that our responsibility doctrines and practices are normatively desirable and consistent with moral, legal, and political theories that we firmly embrace. The first claim is theoretical; the third is primarily normative. There are very powerful arguments for the first and third claims (Lenman, 2006; Morse, 2004). For our current purpose of determining whether criminal law has a free will problem, the second claim is the most important.

Let us begin with the most general responsibility and excusing conditions. Recall that the capacity for rationality is the primary responsibility criterion and its lack is the primary excusing condition. Now, it is simply a fact about human beings that they have different capacities for rationality in general and in specific contexts. Once again, for example, young children in general have less rational capacity than adults. It is also true that rationality differences differentially affect agents' capacity to grasp and to be guided by good reason. Differences in rational capacity and its effects are real even if determinism is true. Compulsion is also an excusing condition, but it is simply another fact about human beings that some people act in response to external or internal hard choice threats to which persons of reasonable firmness might yield and most people most of the time are not in such situations when they act. This is true even if determinism is true and even if people could not have acted otherwise.

For a specific example, consider again the specific doctrines of criminal responsibility. Assume that the defendant has caused a prohibited harm. Recall that responsibility requires that the defendant's behavior was an action and performed with a requisite mental state. Now it is simply true that some bodily movements are intentional and performed in a state of reasonably integrated consciousness and some are not. It is also true that some defendants possess the requisite mental state and some do not. The truth of determinism does not mean that actions are indistinguishable from nonactions or that people do not have different mental states when they act. These facts are true and make a perfectly rational legal difference, even if determinism is true. Determinism is fully consistent with making distinctions among defendants about whether the elements of the crime charged can be proven.

Now consider the defense of legal insanity, which was briefly addressed above. Some people with mental disorder do not know right from wrong; others do. Once again, legally differentiating these cases makes perfect sense according to dominant retributive and consequential theories of punishment. A causal account, including from $G \times E$ in an appropriate case, can explain how these variations were caused to occur, but it does not mean that they do not exist. Determinism is fully consistent with both the presence and the absence of affirmative defenses. In sum, the legal criteria

used to identify which defendants are criminally responsible map onto real behavioral differences that justify differential legal responses.

A causal determinist account would become inconsistent with our responsibility practices only if our scientific investigations convinced us that we are not the types of creatures the law takes us to be—conscious and intentional creatures who act for reasons. If it is true, for example, that we are all automatons, then no one is acting and no one can be responsible for action. I have termed this the “No Action Thesis” (Morse, 2003b, 2008). Unlike the claimed inconsistency between determinism and responsibility, which is a metaphysical question, this critique is empirical and in principle capable of resolution. The conclusion that we are essentially automatons would once again provide an external critique of responsibility and leave no rational room for legal decision making about genuine responsibility. Although some scientists are gesturing in this direction (Wegner, 2002), there is little in current science that suggests that most people most of the time are not conscious and intentional creatures who act for reasons or whose behavior can be guided by reason and incentives (Morse, 2008).

Compatibilism is consistent with our criminal responsibility doctrines and practices, and there is no convincing theoretical reason to reject it. All participants in the criminal justice system, including scientists who contribute to legal policymaking and decisions in individual cases, have good reason to embrace compatibilism. Scientists can comfortably continue to play a crucial role in assisting the promotion of more rational criminal justice without being distracted by the irrelevant issue of free will.

Causation Per Se Does Not Excuse: The “Fundamental Psycholegal Error”

The most persistent confusion about our actual doctrines and practices concerning responsibility, which I have termed the “fundamental psycholegal error” (Morse, 1994), is the mistaken belief that causation, especially by an abnormal cause, is per se an excusing condition. In brief, this error relies on the same argument the incompatibilist makes, but without recognizing that it provides an external critique that must deny the possibility of any responsibility. If the truth of determinism or universal causation is an excusing condition, it applies not just in any particular legal context, such as guilt or sentencing proceedings. It applies everywhere and always.

In a causally deterministic universe, all phenomena, including human actions, are fully caused. If causation were per se an excusing condition, no one could ever be responsible for anything. Thus, causation cannot be an excusing condition in law and morals, both of which hold some people responsible and excuse others. Although this is a simple and straightforward analytic point, the error persists (e.g., Kaye, 2005). If the causal chain

were different, the ensuing action would be different. The question for law is not whether behavior was caused. It is whether the legal criteria have been satisfied. For purposes of assessing responsibility, it does not matter whether the cause of the behavior in question is biological, psychological, sociological, or some combination of the three. Adducing a genetic or neurophysiological cause does no more work than adducing an environmental or interactive cause. The question is always whether the legal criteria for nonresponsibility are met, however the behavior in question may have been caused. A person who is mentally disordered and does not know right from wrong will be excused from criminal responsibility whether his or her rationality impairment was primarily a product of faulty genetics, a neurotransmitter defect, bad parenting, social stress, the alignment of the planets, or some combination of the above, including $G \times E$. The most important question for criminal law is whether the legal excusing condition was present, not how it was caused. Causal knowledge, if sufficiently precise, may help establish whether or the likelihood that the legal criterion in question was satisfied, but the person will be excused if the excusing condition is present, even if we have no idea how the condition was caused.

For example, in *Roper v. Simmons* (2005) the Supreme Court addressed the question of whether adolescents who committed capital murder when they were 16 or 17 years old should be categorically excluded from being sentenced to death. Advocates for abolition for this group of murderers argued that the demonstrated lack of complete myelination of the cortical neurons of the adolescent brain was reason to believe that 16- and 17-year-old murderers were insufficiently responsible to deserve capital punishment. Rigorous behavioral studies had already confirmed the average differences in rational capacity between adolescents and adults. The moral and constitutional implications of the data may be controversial, but the data are not. At most, the neuroscientific evidence provided a partial causal explanation of why the observed behavioral differences exist and thus some further evidence of the validity of the behavioral differences. The neuroscience was thus of only limited and indirect relevance to responsibility assessment, which is based on behavioral criteria concerning rationality. Diminished responsibility follows from diminished rationality, however the latter is caused.

Finally, it follows logically that if full causation is not per se an excusing condition, then "partial causation" also does not partially or fully excuse the agent. Most of the time, we possess only imperfect, partial understanding of the causes of behavior. It is important to remember, however, that not possessing knowledge of the complete causal account of a person's behavior does not mean that a complete causal account does not exist. Indeed, the notion that only some phenomena are caused or determined, but others are not, is incoherent. If this is a universally caused or

deterministic universe, all phenomena are caused, whether or not we have knowledge of those causes.

In any case, discovering a partial normal or abnormal cause for behavior does not partially or completely excuse the agent unless that cause produces a genuine mitigating or excusing condition. For example, various causes we discover may in part explain why an agent's rationality is fully or partially impaired, but then it is the impairment of rationality, not causation, that is doing the excusing work.

Abnormal Causation Does Not Excuse Per Se

Abnormal causation, say, by mental disorder, also does not excuse per se, but excuses only if it produces a genuine excusing condition, such as lack of capacity to appreciate the criminality of one's actions. For example, a person suffering from mental disorder that plays a causal role in the sufferer's behavior may nonetheless retain sufficient capacity for rationality to be held fully responsible. A clinically hypomanic robber, for example, may be especially energetic, mentally acute, and confident when the agent mugs. Indeed, but for the clinical condition, the robber may not have mugged, but there is no question about the agent's criminal responsibility in this case. The robber is sufficiently rational to be held fully responsible.

Causation Is Not Compulsion

Causation is also not the equivalent of compulsion, even if some type of normal or abnormal causal variable played a role in explaining the criminal behavior in question. All behaviors are lawfully caused, but as philosopher David Hume observed, the laws of nature are not coercive (Hume, 1978; Scanlon, 2008). Not all behavior is the product of the external or internal coercive conditions that meet moral and legal criteria for compulsion. If causation were the equivalent of compulsion, everyone would always be compelled and excused. For example, just because a person is predisposed to antisocial activity by a $G \times E$ interaction, it does not mean that the person was compelled to act. For another example, a delusional belief or a hallucination may produce irrational reasons for action, but irrational reasons are not per se more compelling than rational reasons. A person who delusionally believes in the need to use deadly self-defense is no more compelled to act than a nondelusional agent with the same honest belief. The former may be excused because he or she is irrational, but compulsion plays no role in such cases. By the same logic, discovering part of the causation of behavior does not mean that the behavior was compelled to that degree. Causation is not per se compulsion and "partial causation" is not per se partial or complete compulsion.

In conclusion, $G \times E$ will not affect responsibility analysis simply because it is a cause of criminal behavior, even if it produces an immensely predisposing cause. $G \times E$ will be relevant only if it helps prove or disprove the existence of actual criminal law criteria. Let us therefore next examine the specific relevance of $G \times E$ to those criteria.

$G \times E$ AND CRIMINAL RESPONSIBILITY

The question of the relation of $G \times E$ to criminal responsibility reduces to whether $G \times E$ evidence or data cast doubt on the elements of crimes, such as action and mental states, or helps to establish (or cast doubt about) the existence of a complete or partial affirmative defense. $G \times E$ causation, no matter how powerful its explanatory role may be, will only negate responsibility if it prevents a defendant from meeting the responsibility criteria of the criminal law.

Using the example of the armed robber and the $G \times E$ interaction of childhood abuse and a genetic MAOA deficiency with which this chapter began, let us consider how this $G \times E$ affects responsibility. Although I will concentrate on this specific example, the argument is fully generalizable to any $G \times E$ that might causally contribute to criminal behavior.

The first criterion for responsibility is the "act" requirement. The defendant's bodily movements that appear to have violated the law must have been intentional and performed in a state of reasonably integrated consciousness. In other words, the agent must have acted. There is no evidence in the $G \times E$ literature under consideration to suggest that the agents thereby predisposed to criminal behavior are not acting when they commit crimes. Their bodily movements are not the equivalent of reflexes or spasms and they are not performed in a dissociative state, such as sleepwalking. Unless some other explanation for lack of action is forthcoming, our armed robber's behavior is clearly action even if $G \times E$ played a causal role.

A similar analysis applies to whether the defendant possessed the mental state, the "mens rea," such as intention, knowledge, recklessness, or negligence, when the crime was committed. Again, nothing in the literature of the $G \times E$ interaction in question suggests that this causal variable prevents people from forming culpable mental states. Our armed robber, for example, surely had both the intent to steal using a weapon as a threat, and, ultimately, the intent to kill.

It is possible, however, that the effect of the interaction on a defendant's mental capacities may interfere with the formation of some culpable mental states. For example, in some states, intentional killings that are performed after relatively cool, rational deliberation (so-called premeditated murder) are considered especially heinous and punished accordingly.

Although I know of no such data, suppose it could be demonstrated that $G \times E$ made it extremely difficult to plan coolly and rationally for those subject to it. In that case, the $G \times E$ evidence would help the law decide if an intentional killer in fact premeditated. Notice, however, that it is lack of premeditation, not $G \times E$ itself, which might explain why the killer is not guilty of the aggravated degree of intentional homicide. If there were clear behavioral evidence that the defendant did premeditate or was capable of doing so despite the $G \times E$ —and, of course, there will be variation among people with this $G \times E$ —then the defendant would be guilty of aggravated homicide despite the evidence that $G \times E$ tends generally to make it difficult to premeditate.

Another example would be recklessness. Recall that the criminal law's definition of recklessness is conscious awareness that one's conduct is creating a high risk of a prohibited harm. It is a subjective mental state. Suppose good evidence suggested that people with $G \times E$ are extremely poor estimators of the consequences of their conduct. If so, the $G \times E$ evidence would be relevant and probative of whether a defendant actually was aware of the risk created. And again, if the behavioral evidence suggested that the defendant was actually aware of the risk despite the $G \times E$, say by advertent to it in comments to accomplices, then $G \times E$ data would be trumped.

Consider negligence as a final example. Negligence is the failure to be aware that one's conduct is creating a high risk of a prohibited harm in situations in which a reasonable person should have been aware of the risk. It is considered an "objective" mental state because we are comparing the defendant to a hypothetical reasonable person. Suppose good evidence suggests that $G \times E$ makes it very difficult for those subject to it to behave as reasonable people should. Although there is a good argument for negating the presence of negligence in that case (Hart, 1968), the law is unforgiving about negligence. Everyone is held to the standard of the reasonable person, including those people who may find it supremely difficult to meet that standard through no fault of their own. Any mitigation based on the defendant's deficiencies would only be considered at sentencing, which I address in the next section.

In short, $G \times E$ is not likely to have much if any effect on the formation of the act and mental state elements of the crime charged.

$G \times E$ is most likely to be relevant to the generic excusing conditions: lack of rational capacity and lack of the capacity to control oneself. $G \times E$ is not likely to be relevant to compulsion, criminal action compelled by "do-it-or-else" threats using death or grievous bodily harm as the "or-else" because these threats must be external. Lack of rational and of control capacity have technical legal doctrinal criteria, but for our purposes it is sufficient to use the generic justifications for the doctrinal excuses, such as infancy, legal insanity, and duress.

Before we can answer whether $G \times E$ is relevant to rational and control capacity, it is necessary to explore what we mean by these capacities in a bit more detail. There is no consensual definition of rationality in any of the relevant disciplines, such as psychology, psychiatry, economics, and philosophy, that study this issue. Likewise, there is no uncontroversial legal definition of rationality or of what kind and how much is required for responsibility in various legal contexts. Rationality for the law must be understood according to some contingent, normative notion both of rationality and of how much capability is required. For example, legal responsibility might require the capability of understanding the reason for an applicable rule, as well as understanding the rule's narrow behavior command and the consequence for failure to comply. These are matters of moral, political and, ultimately, legal judgment about which reasonable people can and do differ. These are normative issues about intentional behavior guided by reasons.

If one examines the various legal responsibility and competence doctrines that implicitly address rationality defects, however, one can infer that the law's general definition is a congeries of abilities that closely track an ordinary person's commonsense definition. For example, the agent must be able to get the facts right, to know what he or she is doing, to be able to respond reasonably to reasons and incentives in the context in question, and the like. For example, one criterion for legal insanity is that the agent does not know what he or she is doing. For another example, one criterion for incompetence to stand criminal trial is that the defendant is unable to understand the nature of the charges against him or her and the nature of the trial proceedings that are about to occur. Deciding whether such criteria are met requires an implicit, commonsensical folk psychological definition of rationality of the sort we all use everyday to evaluate our own conduct and the conduct of others.

It is much harder to provide a folk psychological account for the lack of capacity to control oneself that is independent of a rationality defect. People commonly use locutions like "I can't help myself," "I lost control of myself," and like expressions, but what do they mean? When people "lose control" and act badly, they are surely acting, but what is the folk psychological process that suggests loss of control? Various models have been used to try to inject content into the process, including a collapse of control problems into rationality defects (Morse, 2002), but none has seemed conclusive. Moreover, at present we have no way of distinguishing action that a person cannot control from action he or she simply did not control. Such practical difficulties in part accounted for why both the American Bar Association and the American Psychiatric Association recommended abolishing "control" criteria for legal insanity in the mid-1980s.

The definitional problems persist. A recent, influential legal example is the Supreme Court's decision in *Kansas v. Crane* (2002), in which a criterion

of “serious difficulty” controlling oneself was constitutionally required to be proven before a state could civilly commit a so-called mentally abnormal sexually violent predator. There was a withering dissent about the difficulty of making this conclusory judgment and the courts that have since tried to interpret this requirement have been unable to do more than simply repeat the “serious difficulty” formula without further operationalization.

A current example from psychiatry is the conclusion that the drug seeking and using of addicts is “compulsive.” It is question begging to say the addict cannot control seeking and using because those behaviors are signs of a disease. Actions are different from the purely mechanistic signs and symptoms of most diseases, such as fevers or metastases. The lack of ability to control action must be demonstrated independently (Fingarette & Hasse, 1978). The psychiatric conclusion about compulsion is not based on such an independent, operationalized measure. It is based on the commonsense conclusion that people who persist in behavior that often creates ruinous medical, psychological, fiscal, personal, and legal problems and who report feelings such as craving must not have good control over their drug-related behavior. Although there is reason to question this conclusion, especially in its strongest form (Heyman, 2009), no folk psychological process has been specified even if we do accept it.

In short, adequately defining control capacity is a problem for criminal law that science has not yet solved. Nonetheless, the ensuing discussion will assume for the sake of argument that we can make sense of control problems. Like the rationality criterion for responsibility, the degree of control the law will require is a normative matter that can vary from one legal context to another.

To be relevant to legal excuses, $G \times E$ data will have to be translated into the law’s folk psychological definitions of rational capacity and control capacity. The $G \times E$ studies in question were not clinical or thick phenomenological descriptions of the high-risk subjects. For the sake of general argument, however, let us assume a number of folk psychological variables that might in part account for the high rates of offending among these subjects. Nothing turns on whether these are the correct variables because the argument that will be made is general and would apply to whatever variables are doing the explanatory work. Consequently, let us simply assume that the subjects may have been highly sensation seeking, impulsive, or suffering from poor judgment.

These types of folk psychological variables are relevant to commonsense notions of rational and control capacity. Moreover, science can help operationalize and measure such variables. For example, the amicus (“friend of the court”) briefs of the American Psychological Association in the *Roper v. Simmons* (2005) case and in the recently decided Supreme Court case concerning the constitutionality of sentencing juvenile offenders to life in

prison without the possibility of parole (JLWOP) for nonhomicide crimes, *Graham v. Florida* (2010), are replete with studies of the decision-making abilities and other psychological variables that are relevant to whether adolescents as a class are on average less responsible than adults because they have less rational capacity. Whether the differences between adolescents and adults are sufficiently large in quantity and quality to warrant differential treatment is, of course, a normative moral and legal question that science cannot answer, but the data are surely relevant to the legal decision that must be made.

The same type of analysis applies to $G \times E$ offenders, including our armed robber. Assuming that the folk psychological process $G \times E$ produces adversely affects rational and control capacities, the question will be whether the adverse effects are sufficiently large to warrant excuse or mitigation for criminal conduct. Treated as a general matter of legal policy, a question would be whether the effects are so marked that we should mitigate the culpability of $G \times E$ offenders as a class and forego individualized evaluation on a case-by-case basis. The law generally disfavors such general as opposed to individualized decision making, although it has been willing to prohibit the capital punishment of murderers from the reasonably well-delineated classes of people with retardation (*Atkins v. Virginia*, 2003) and of killers who were 16 or 17 years old at the time of the capital crime (*Roper v. Simmons*, 2005).

Assuming that $G \times E$ does have psychological effects that bear on responsibility, it is virtually certain that $G \times E$ offenders would have their culpability assessed individually through doctrinal excuses or at sentencing. Recall that the offender's actual behavior will be more probative than the group data. If the offender's history and conduct at the time of the crime indicate no substantial defects, the group data will be of little avail. Actions speak louder than $G \times E$. If the offender's capacities are unclear, however, the group data might help.

Unfortunately for $G \times E$ offenders, no general excusing condition seems to apply. The insanity defense may seem like the strongest opportunity, but $G \times E$ offenders will not qualify for the insanity defense unless they also suffer from a major mental disorder that causes them to lose touch with reality. This is required by many jurisdictions and in practice suffering from gross loss of contact with reality is necessary to succeed with an insanity defense even if the legal rule does not specify that the disorder must have psychotic features. No other general excusing condition is even remotely applicable. Criminal law has few mitigating doctrines that are considered at trial to which the folk psychological processes $G \times E$ produces would apply. I have proposed that criminal law should adopt a generic "partial responsibility" doctrine based on diminished rationality that would be considered at trial and that would mitigate the offender's degree of conviction and punish-

ment if the claim were successful (Morse, 2003a). Alas, no jurisdiction has adopted or is even considering this proposal. Again, such factors may be considered at sentencing, which I consider in the next section.

The arguments that I have been making about the $G \times E$ that Caspi and colleagues (2002) discovered are fully generalizable to any future $G \times E$ discoveries. The evidence would have to be relevant to the criminal law's folk psychological criteria for whether the defendant acted, whether he or she possessed the mental state required by the definition of the crime, and whether an excusing condition, such as lack of rational or control capacity, is established. Whether $G \times E$ played a causal role in explaining the criminal behavior is legally irrelevant unless one falls prey to the "fundamental psycholegal error" of thinking that causation is an excuse. This conclusion applies even in the unlikely event that *every* person subject to the $G \times E$ in question commits a crime. A genuine excusing or mitigating condition would still have to be established to defeat the allegation of criminal responsibility. After all, in a lawful causal world, all human behavior is fully explained by the causal background that produced it. If causes were excuses, no one would be responsible. That is not the legal and moral world we inhabit and it is not likely to be.

In short, $G \times E$ will seldom play much role in guilt determinations, but it may play a more extensive role in sentencing and parole decisions, to which I now turn.

$G \times E$ AND SENTENCING

Questions concerning mitigation and potential future dangerousness are primarily the province of sentencing decisions. The question at sentencing is how $G \times E$ evidence would be relevant to sentencing criteria. This section begins by considering sentencing practices generally, and then turns to how $G \times E$ might be relevant.

In most U.S. jurisdictions, there is a range of permissible sentence for each crime and the sentencing judge has virtually complete discretion to impose any sentence within that range or to place the defendant on probation. A minority of jurisdictions, including the federal system, have guidelines that constrain judicial discretion, but even in such constrained systems judges have some discretion about the sentence to be imposed. Thus, sentencing judges can consider mitigating and aggravating factors not considered at trial to adjust the offender's sentence up or down within the statutorily permitted range of sentence for the crime. Sentencing criteria in noncapital cases are undertheorized and often not specified, thus leaving judges unguided discretion. Capital punishment must be decided by a jury (*Ring v. Arizona*, 2002), and there are typically statutory aggravating

and mitigating factors the jury must consider. In addition, beginning with *Lockett v. Ohio* (1978), the Supreme Court made clear in many decisions that the defendant facing capital punishment may present virtually any evidence that could conceivably be mitigating even if the statutory mitigating factors do not include the factor the evidence supports.

Consider mitigation first. Sentencing practices are often considerably less clear than the criteria for guilt. For example, the erroneous "causal theory of excuse" appears to be taken into account for mitigation. The rationale seems to be that understanding the causes of the defendant's behavior somehow reduces responsibility per se. The Italian judge's reduction of the defendant's sentence on the ground that the defendant was predisposed to violence when stressed suggests that the judge was implicitly adopting this rationale. On the other hand, the evidence introduced at sentencing may suggest that mitigation is warranted because the defendant suffered from substantial rationality or control deficits, even if they were not sufficiently substantial to rise to the level of a full legal excuse. Such a claim would be entirely supported by retributive and perhaps consequential justifications for punishment that we firmly embrace. Even if the defendant was criminally responsible, he or she may deserve a lesser sentence if he or she was not fully rational at the time of the crime.

A central aggravating factor is the predicted future dangerous conduct of the defendant, which is considered not only at sentencing itself, but also for parole decisions. In capital sentencing statutes, future dangerousness is often expressed by criteria based on past behavior, such as prior convictions, and sometimes it is expressed directly. This ground for aggravation or for denial of parole is purely consequential—the protection of the public. Of course, by the same logic, defendants who are less predictably dangerous should receive lesser sentences on consequential grounds. The major practical issue is determining how accurately we can predict future dangerous conduct and how much contribution to such accuracy evidence such as $G \times E$ might contribute. Current law is accepting of predictions based on weak evidence (e.g., *Barefoot v. Estelle*, 1983), but well-validated prediction factors have the potential to make prediction decisions more rational and just. Other aggravating factors include the defendant's failure to show remorse, and committing the crime in a particularly dangerous or cruel manner (which is a culpability factor as well as an indication of dangerousness).

Note one final feature of using prediction of future dangerousness as an aggravating factor. It appears to deny the offender's agency and dignity by suggesting that the offender cannot be guided adequately by reason (Duff, 2007). This may be justified by consequential justifications and there is no problem concerning retribution as long as the sentence remains within the statutorily authorized range, but it is nonetheless an undesirable aspect of prediction practices concerning responsible agents.

Now let us consider the relation of $G \times E$ to this brief account of sentencing, returning to our armed robber for final consideration. There is little dispute that people with his $G \times E$ are highly predisposed to committing criminal or otherwise antisocial acts. To the extent that the judge or jury in a capital case accepts the "causal theory of mitigation," the sentence may be reduced despite any clear rationale for doing so. Another theory might also be lurking to support mitigation, although it depends on only the abuse part of the interaction. The rationale is that the hard life suffered by the defendant has been "payment in advance" (Klein, 1990) or sufficient previous suffering that should reduce the amount of suffering that should be imposed now. This theory has no legal basis, but it may play a role psychologically. In any case, note that this theory has little to do with the $G \times E$ specifically. It is possible, however, that the same psychological characteristics $G \times E$ produces that predispose the armed robber to crime are rationality or control defects. If so, there will be good theoretical reason to mitigate the armed robber's sentence.

Now let us turn to how $G \times E$ might be relevant to sentencing aggravation, parole, or commitment decisions. The very same evidence of $G \times E$ predisposing the armed robber to future criminal behavior would certainly be considered a risk factor for future criminality, and thus would support a longer sentence and denial of parole. The issue would be the practical one of accurately assessing how much $G \times E$ predisposes to future criminal behavior. Also, if this $G \times E$ were linked not only to future dangerousness, but also to lack of remorse, then it might be further confirmation of behavioral indications that this defendant lacked remorse.

In brief, $G \times E$ evidence can be a knife that cuts both ways, supporting both mitigation and aggravation.

G \times E FOR CRIMINAL LAW ISSUES OTHER THAN RESPONSIBILITY AND SENTENCING

Understanding the causes of criminal behavior may be vitally useful within and without the criminal justice system to questions concerning rehabilitation and prevention. For example, outside the criminal justice system, it may be useful for establishing policies and programs that will reduce the risk of antisocial behavior. Fully discussing these uses raises complex issues and would require a chapter in itself, but I will gesture at them in this section.

For many reasons, including issues of retributive and distributive justice and civil liberties, rehabilitation is no longer considered a prime goal of the criminal justice system and it is of diminished importance within the delinquency jurisdiction of juvenile justice and especially when juveniles

who commit crimes are tried as adults. Nonetheless, if causal knowledge could help create effective, cost-benefit justified rehabilitation methods for some prisoners, there would be impetus to use them because recidivism imposes major costs on our society. Whether a particular $G \times E$ that predisposes people to criminal offending is amenable to specific rehabilitation methods derived from that causal knowledge is of course an open empirical question that good research can help answer. Whether an apparently effective intervention is cost-benefit justified is of course a normative moral, political, and legal question that science cannot decide.

Causal $G \times E$ knowledge may also be the key to prophylactic policies and programs that would be established outside the criminal justice system. Yet again, whether specific policies and programs would be effective and cost-benefit justified are open empirical and normative questions. There are risks associated with identifying classes of people and individuals as "at risk" for criminal behavior. Labeling effects, interventions that are unnecessary and often counterproductive for many recipients, and privacy issues are examples of the potential negative effects of such policies and programs. Let us hope, however, that advancing causal knowledge, whether from $G \times E$ or other fields, does point the way to successful preventive intervention and that the potential negative effects could be minimized.

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