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The Decision to Commit Crime: Rational or Nonrational?

Glenn D. Walters
Kutztown University

ABSTRACT AND ARTICLE INFORMATION

Rational choice theory has received a fair amount of attention from criminal justice scholars and societal policy makers looking for an alternative to traditional deterministic theories of criminal behavior and is a core feature of several major criminological theories. In an effort to provide a more comprehensive perspective on criminal decision-making, the current paper highlights the role of emotion in the choice process and reviews factors that increase the likelihood of antisocial outcomes. The result is a theory of decision-making in which the individual is believed to act on the hedonistic and moral emotions that guide moral decision-making and where irrelevant emotions are enhanced and relevant emotions dampened by cognitive and situational factors that, in the end, serve as the foundation for criminal choice.

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Grounded in the early philosophical writings of Cesare Beccaria (1738–1794) and Jeremy Bentham (1748–1832) and what would eventually become known as the classical school of criminology, rational choice theory has become a major force in modern-day criminology. It is a core feature of several major criminological theories—deterrence theory (Paternoster, 2010), routine activity theory (Cohen & Felson, 1979), social learning theory (Akers, 1998), general strain theory (Agnew, 1992), social interactionism (Tedeschi & Felson, 1994), and Gottfredson and Hirschi's (1990) general theory of crime, to name just a few—and one popular approach to crime control—situational crime prevention (Clarke, 2009). In contrast to deterministic theories of criminality and criminal justice, rational choice theory maintains that criminals and non-criminals differ only in the choices they make. The purpose of this paper is to explore the role of emotions in decision-making and provide an alternative view of criminal decision-making that incorporates both the rational and nonrational elements of the criminal choice process.

Rational Choice Theory

Rational choice theory (RCT) is based on a number of principles, seven of which are listed below (Gul, 2009):

1. Rationality: The human being is a rational actor.

Corresponding author: Glenn D. Walters, Kutztown University, 15200 Kutztown Rd., Kutztown, Pennsylvania, 19530, USA.
Email: walters@kutztown.edu

2. Utility: The actor makes means/ends calculations as part of the decision-making process.

3. Hedonism: In making means/ends calculations, the actor seeks to maximize pleasure and minimize pain.

4. Expectations: It is the anticipation of pain or pleasure that directs the decision.

5. Social Exchange: The decision the actor makes is the culmination of a cost-benefit analysis of different courses of action that are available to him or her at any one particular point in time.

6. Bounded rationality: The actor evaluates alternatives within the limits of his or her knowledge and abilities.

7. Punishment: The effectiveness of a legal or extralegal sanction is a function of the certainty, celerity (swiftness), and severity of punishment.

RCT borrows extensively from economic theories of choice behavior (Becker, 1968; Schmidt & Witte, 1984) but without the complex mathematical formulae economic theorists use to calculate the costs and benefits of crime. The version of RCT that has received the greatest measure of attention and empirical support in the field of criminology is the *Reasoning Criminal* perspective proposed by Cornish and Clarke (1985, 1986). In presenting their views on criminal decision-making, Cornish and Clarke (1986) hypothesized that offenders assess the likely consequences of their actions before engaging in crime. Their principal goal, however, was not to construct a complete explanation of criminal decision-making, but to provide justification for a policy of situational crime prevention (Clarke, 2014). Therefore, while they concede that offender rationality is bounded by limitations in human information processing, situational context, and emotions, they never integrated these constructs into their theory (Wortley, 2014). One prominent limitation of RCT in general and Cornish and Clarke's (1986) perspective in particular is that the affective or emotional aspects of crime and criminal decision-making are not well integrated into the theory (de Haan & Vos, 2003). Thus, where RCT does a fairly good job of explaining economic/acquisitive crime, it does a less adequate job of explaining non-economic or expressive crime (Hayward, 2007).

In describing the evolution of nonrational choice theories of economic behavior, Zafirovski (2012) estimates that one-third to one-half of all economic decisions represent emotional or nonrational choices, activities, and outcomes. Add to this the fact that Pratt and Cullen (2005), in a meta-analysis of existing studies on rational choice theory and crime, discerned that macro criminal justice indicators related to RCT predicted criminal behavior only weakly and that introducing deterrence-based social policies, from increasing the size of police departments to passing "get tough on crime" legislation, had virtually no effect on the crime rate. When the respective abilities of the three principal components of deterrence theory—i.e., the certainty, celerity, and severity of punishment—were analyzed and compared, only one of the three (certainty) had any effect on crime, and the effect was modest (Paternoster, 2010). These research findings indicate that RCT requires something more than what it currently possesses to effectively predict and manage crime. The missing element, according to the current paper, is greater attention to emotion in the decision-making process.

In an effort to address the limitations of RCT several groups of researchers have conducted studies designed to highlight the role of emotion and affect in the criminal decision-making process. Lindegaard, Bernasco, Jacques, and Zevenbergen (2014), for instance, examined the role of emotion in robbery by conducting interviews with 76 robbers. The results of their study indicated that different emotions were instrumental at different points in the robbery sequence, but that fear was dominant before and during the robbery, and happiness was dominant after the robbery. In a study using male and female undergraduates as subjects, Bouffard (2014) showed that sexual arousal contributed to a rise in the perceived benefits of coercive sexual behavior in men as well as in women. Using two different groups of college students, Van Gelder, Reynald, and Elffers (2014) determined that anger consistently encouraged participants to retaliate against the person they believed was responsible for their anger, even if that meant being dishonest or underhanded in achieving their goals. The premise of this paper, then, is that greater consideration of the role of emotion in criminal and non-criminal decision-making will inform and improve criminological theory.

Emotion in Human Decision-making

Linking Emotion to Choice

There are a number of reasons why criminologists have rejected RCT as a complete explanation of crime. One has been its weak ability

to explain expressive crime and the role of impulsivity in the commission of these type offenses. In an early study on this issue, Forgas (1991) determined that negative mood states often led to reduced impulsivity and risky decision-making, whereas positive mood states led to increased impulsivity and risky decision-making. A decade later, Gordon and Arian (2001) ascertained that situational factors played a potentially important role in the relationship between emotions and decision-making. In this study, decision-making was dominated by emotion under conditions of high threat but not under conditions of low threat. Under conditions of low threat, decision-making was modulated by a blending of emotion and logic. In a third study, cognitive modulation of emotion was found to reduce impulsivity and risky decision-making compared to participants who were instructed not to cognitively regulate their emotions (Martin & Delgado, 2011).

Emotions not only interfere with decision-making, they also facilitate it. Damasio (1994) created the somatic marker hypothesis to illustrate how people use emotion to make decisions. The founding premise of the somatic marker hypothesis is that in addition to weighing the perceived costs and benefits of alternate courses of action, people also weigh the emotional quality of each potential outcome. Damasio (1994) defines somatic markers as associations between reinforcing stimuli and physiological responses (specific emotions plus their allied bodily reactions). These physiological reactions bias the individual toward certain options ("feels right") and away from other options ("feels wrong"). In essence, somatic markers simplify and speed up the decision-making process. According to Damasio (1994), bodily change and affect interact in two principal ways: Bodily or somatic change projects directly to the brain where it evokes an emotion ("body loop": e.g., seeing a snake on the trail in front of one elicits a fear response) or a cognitive representation of the emotion evokes the emotion and brings about a corresponding change in the body or soma ("as if body loop": e.g., thinking about the possibility of seeing a snake on the trail up ahead elicits a fear response).

Neuroanatomical Underpinnings

Damasio's (1994) somatic marker hypothesis implies that emotions impact decision-making through specific brain structures and pathways. One theory holds that the orbitofrontal cortex is the site where emotions interface with bodily signals to affect the decisions we make. Lesions in this area of the brain have been found to interfere with the processing of somatic and emotional responses and have been linked to a range of antisocial behaviors (Bechara, Damasio, & Damasio, 2000). Consistent with the somatic marker hypothesis, activity in the lateral orbitofrontal cortex has been shown to guide decision-making. In fact, neural activity in this area can both inhibit emotional information that is not contextually relevant to a decision and highlight emotional information that is contextually relevant to a decision (Beer, Knight, & D'Esposito, 2006). The orbitofrontal cortex may also be involved in the development of the complex emotional-perceptual process of empathy (Shamay-Tsoory, Harari, Aharon-Perez, & Levkovitz, 2010).

The orbitofrontal cortex is part of the paralimbic system. A core limbic structure, the amygdala, may also play a leading role in the decision-making process via its effect on emotion. It has been speculated that the amygdala creates an emotional response that mediates the relationship between a decision and its outcome, reward versus punishment (Everitt, Cardinal, Parkinson, & Robbins, 2003). Individuals with damage to the amygdala lack this vital feedback loop (Gupta, Koscik, Bechara, & Tranel, 2011). According to the results of a recent study, the amygdala is involved in cognitive modulation of emotion during the process of decision-making (Sokol-Hessner, Camerer, & Phelps, 2013). The dopamine-rich striatum (caudate nucleus and putamen) is another brain region that has been implicated as a possible mediator of the emotion-decision-making relationship. A recent review showed that in antisocial individuals, the striatum may not be properly processing the absence of reward; consequently, the organism continues to respond to a non-rewarding stimulus as if it were receiving reinforcement (Glenn & Yang, 2012).

Developmental Context

The decision-making process can also be viewed within a developmental context. After all, we would not expect an 8-year old child to display the same level of decision-making ability as an 18-year old young adult. Eighteen-year olds have more life experience and more efficient brains and are therefore more capable of making informed decisions than 8-year olds. The individual roles of emotion, situational factors, and limbic and striatal brain structures in the decision-making process also vary as a function of age. Blakemore and Robbins (2012), for instance, note that adolescents are more likely to engage in risky decision-making than either children or adults, especially when emotions are high, peers are present, and self-esteem is at stake. These "hot" situations appear to interfere with the rational choice process and increase the individual's chances of making a risky decision.

Young children often report feeling happy after committing a moral transgression (Arsenio, Adams, & Gold, 2006), whereas adolescents, particularly older adolescents, are more apt to experience positive feelings following a moral choice (Malti, Keller, & Buchmann, 2012). This may be partly the result of a developing sense of empathy. There are several developmental tasks that contribute to the formation of empathy, but one of the most important is a nascent "theory of mind" in which the child learns to ascribe thoughts, feelings, knowledge, and intentions to others (Premack & Woodruff, 1978). Studies show that "theory of mind" has both cognitive and affective elements and that the affective elements continue developing over the course of adolescence and may bring about changes in the orbitofrontal cortex (Blakemore & Robbins, 2012; Sebastian et al., 2011; Shamay-Tsoory et al., 2010).

The Role of Temperament

In conceptualizing the manner in which criminal decision-making supports criminal behavior, it is important to keep in mind that decision-making is a function of emotion and cognition and that emotion and cognition are, in turn, a function of certain neuroanatomical and developmental factors. These neuroanatomical and developmental factors are themselves components of temperament. Developmental psychologists define temperament as a predisposition to respond to the environment in specific ways (Rothbart, 2007). Whereas temperament begins as a genetic disposition, it is shaped by ongoing interactions with the environment, starting in the womb and ending only in death (Kagan, 2010). The neuroanatomical and developmental underpinnings of criminal decision-making, in fact, owe their existence to temperament.

Temperament is normally measured in dimensions and two dimensions, in particular, are believed to be central to criminality: fearlessness and disinhibition (Walters, 2012). Whereas fearlessness entails poor fear conditioning, disinhibition entails weak behavioral controls. Neurophysiologically, fearlessness is believed to stem from limbic system hypofunction in areas like the amygdala (Cherbuin et al., 2008), weak empathy, and proactive criminal thinking. Disinhibition, on the other hand, is considered to be the result of a hyperfunctioning striatum and hypofunctioning hippocampus (Sah, Faber, Lopez de Armentia, & Power, 2003), weak impulse control, and reactive criminal thinking. Research indicates that low gray matter concentrations in the amygdala and hippocampus correlate with fearlessness and disinhibition, respectively (Walters & Kiehl, in press), and that proactive criminal thinking is more closely tied to fearlessness and reactive criminal thinking to disinhibition (Walters, 2015); the developmental aspects of the two dimensions, however, remain to be worked out.

Moral Emotions and Expectancies

It would appear that emotions and relevant areas of the central nervous system involved in the manufacture and suppression of emotion (limbic structures and striatum) impact decision-making by means of the "body loop" and "as if body loop," both of which function within a developmental context and can be considered aspects of temperament. But how, the reader might ask, does this translate into a decision? I would argue that one way emotions impact on decisions is via moral emotions and expectancies. It has been stated that moral emotions link moral standards to moral behavior (Tangney, Stuewig, & Mashek, 2007). Moral in this case means consistent with one's moral standards. Hence, if I hold to a moral standard that "stealing is wrong," but go ahead and steal anyway, I may feel guilty and ashamed. If I end up getting caught and punished, the guilt will probably become even stronger, and the notion that "stealing is wrong" may become even more ingrained in my moral belief system. This, then, is a moral emotion that registers as positive in the case of a moral decision (pride, empathy) and negative in the case of a counter-moral decision (guilt, shame).

The role of moral emotions is to provide feedback on how well one's decision matches one's moral standards. To understand how individuals act on their moral emotions in making decisions, we must consider moral expectancies. A moral expectancy is how we expect to feel if we were to put a particular decision into action. Because it precedes the decision it provides us with feedback on how well the decision conforms to our moral standards (Loewenstein & Lerner, 2003). If I think about stealing and feel guilty about the act, fearful of other people's reactions, or ashamed of what other people might think, then I am much less likely to steal, no matter how tempting or available the opportunity. Krettenauer, Jia, and Mosleh (2011) conducted an experiment on 160 adolescents in which moral expectancies were found to influence decision-making in both antisocial and prosocial contexts. In the antisocial context, negative expectancies of one's failure to act morally (guilt) predicted moral choices. In the prosocial context, positive expectancies of one's success in acting morally (pride) predicted moral choices.

A Theory of Rational and Nonrational Choice

The current framework is related in some ways to Daniel Kahneman and Amos Tversky's early work on heuristics and cognitive biases in general decision-making (Kahneman & Tversky, 1973, 1979; Tversky & Kahneman, 1974) but with a focus on criminal decision-making, which may or may not be different from everyday decision-making. In constructing a theory of rational and nonrational choice and crime, I have attempted to integrate what might be considered the greatest oversight of the rational choice theory of crime—i.e., emotion—with what is perhaps its greatest strength—i.e., the utilitarian framework.

The first level of this integrated theory consists of a series of bidirectional relationships between a person's hedonistic and moral belief systems, a decision, and a resulting outcome. The second level of the theory consists of hedonistic (e.g., anger, pleasure) and moral (e.g., guilty, pride) emotions. Properly modulated hedonistic emotions inform decision-making. Poorly modulated hedonistic emotions, by contrast, disrupt the utilitarian decision-making process. Moral emotions inform the utilitarian decision-making process by allowing standards from the moral belief system to influence one's decision. The third level of the theory consists of situational, neuroanatomical, developmental, and criminal thinking influences that stimulate contextually irrelevant (to the decision) hedonistic emotion, on the one hand, and situational, developmental, and criminal thinking factors that inhibit contextually relevant moral emotion, on the other hand.

At all three levels of the theory used to explain criminal decision-making in this paper, the individual acts on his or her emotions, thinking styles, environment, and neurodevelopmental context in arriving at a decision, rather than being acted upon by these same emotional, cognitive, environmental, and neurodevelopmental factors. All three levels of the theory and their relationships are depicted in Figure 1. To help clarify the model and make it more understandable to the reader, an example of a newly released prisoner contemplating the possibility of robbing a bank will be used to illustrate each level of the model. We will call this individual Bob.

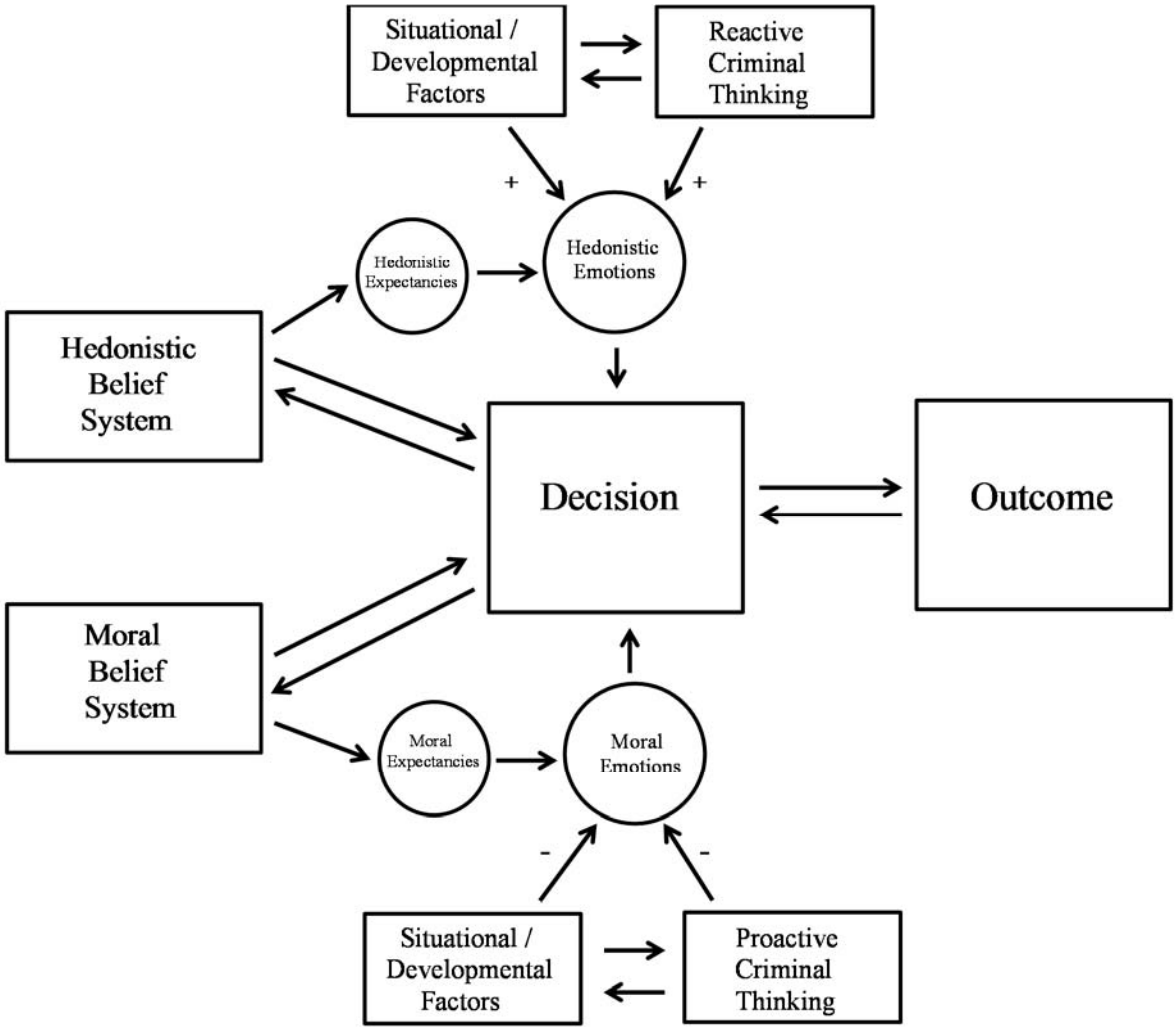
The Hedonistic Belief System

The hedonistic belief system is coded with reward experiences and associations between environmental stimuli and emotions from the past. It could be considered a repository of reward experiences or a roadmap of a person's reinforcement history. The significance of the hedonistic belief system to the decision-making process is that it provides the decision-maker with information on the subjective value he or she assigns to various options (i.e., it serves a heuristic function). The hedonistic belief system has strong ties to the dopamine-rich striatum and associated ventral tegmental area (VTA) as well as a limbic structure known as the hippocampus. Dopamine is an excitatory neurotransmitter that is released under conditions of excitement, pleasure, and reward. As such, it provides feedback on the kinds of actions that lead to rewarding outcomes. Properly modulated by serotonin receptors in the hippocampus and elsewhere, this information can be useful in making quick and efficient decisions. Unmodulated, the hedonistic belief system can promote risky decision-making and temporal discounting. As represented by the double arrows in Figure 1, the hedonistic belief system shapes a person's decisions and is, in turn, shaped by these decisions as well as their outcomes (feedback loop).

Hedonistic Emotions. Hedonistic emotions like anger, frustration, urgency, excitement, and pleasure demand immediate gratification and derive conceptually from the hedonistic belief system. These emotions, which call for immediate action, are considered relevant when they are properly modulated and assist rather than interfere with decision-making. Hedonistic emotions are modulated by both cognitive and neurochemical processes, and they assist the decision-making process by providing feedback on positively reinforcing stimuli and events. These emotions are labeled as irrelevant when they are unmodulated and interfere with one's ability to make a balanced or reasoned decision. Situational and emotional factors, if not properly modulated, will interfere with decision-making (Bowen, Roberts, Kocian, & Bartula, 2014). After reviewing the literature on emotion and problem solving, Angie, Connelly, Waples, and Kligyte (2011) concluded that anger often leads to risky decision-making, with the strongest contrast being between anger and guilt. In other words, anger is highly capable of disrupting the decision-making process whereas guilt may provide the moral guidance required for balanced decision-making.

Emotions like anger, frustration, and excitement are often stimulated or amplified by situational (stress, peers) and cognitive (reactive criminal thinking) factors (see Figure 1). Emotional enhancement is one way emotions impact on decision-making; the other way emotions impact on decision-making is through a process of emotional dampening, as exemplified by an antisocial moral belief system. Youth who are under stress or who are

Figure 1. The Rational/Nonrational Choice Model



Note. + = excitatory influence; - = inhibitory influence.

trying to impress their peers are more apt to engage in risky decision-making than youth who are not under stress or who are not trying to impress their peers. Reactive criminal thinking styles like cutoff, cognitive indolence, and discontinuity (see Table 1) may enhance hedonistic emotions like anger, frustration, urgency, excitement, and pleasure such that they interfere with one's ability to effectively solve a problem. Table 2 lists the three reactive thinking styles and the emotions they typically elicit. They are referred to as reactive because they encourage the individual to react emotionally to the environment and lead to a "hot-blooded" response in contrast to the calculated, "cold-blooded" actions elicited by proactive criminal thinking (Walters, 2012).

Impulsivity can result from low self-control or temporal discounting. Whereas low self-control denotes a lack of awareness of future consequences or inability to prevent oneself from selecting a small short-term reward over a larger long-term reward, temporal discounting involves failure to take long-term rewards into account when making a decision despite being aware the long-term reward is larger than the short-term reward (Marcus, 2004). Research indicates that offenders exhibit higher levels of temporal discounting than non-offenders (Arantes, Berg, Lawlor, & Grace, 2013; Hanoch, Rolison, & Gummerum, 2013). Consistent with the hypothesis that reactive criminal thinking can interfere with decision-making by stimulating irrelevant emotion, Varghese, Charlton, Wood, and Trower (2014)

discovered that temporal discounting correlated with reactive criminal thinking but not proactive criminal thinking in a group of 146 male inmates five months short of release.

Bob, the individual who was just recently released from prison and is contemplating robbing a bank, will be used to illustrate how the hedonistic belief system operates. We note that Bob has no family other than a brother who lives in another state, and his only friends are old crime partners and individuals he met in prison. He made several half-hearted attempts to find a job when he was first released but nothing materialized, and he has since given up looking for legitimate employment. At this point in time, Bob is frustrated, angry, and desperate. In addition, he is experiencing high levels of hedonistic emotion in both its positive (anticipating the thrill of committing a crime again) and negative (anger and frustration) forms, and his thinking is characterized by a hair-trigger cutoff and pervasive discontinuity. His decision-making will accordingly be less than optimal because he is now acting on hedonistic emotions that are clouding his judgment.

The Moral Belief System

The moral belief system is composed of standards, norms, values, and morally relevant elements of a person's self- and world-views, such as reflected appraisals and notions of fairness. Like the hedonistic belief system, it is locked in reciprocal association with decisions and outcomes. Continued involvement in criminal activity can lead to an expanding antisocial moral belief system and further decisions to commit crime. In fact, this is one way criminal decisions are made. Those with an antisocial moral belief system are antagonistic toward society and because crime tends to run counter to the conventional social order, such individuals frequently favor the criminal option. Most offenders do not appear to possess an entirely antisocial moral belief system, however, given the frequency with which neutralization is used by a large portion of society's lawbreakers to eliminate guilt and justify criminal activity (Maruna & Copes, 2005; Sykes & Matza, 1957). This means that other avenues of criminal - must be responsible for the bulk of criminality found in society.

Moral Emotions. While hedonistic emotions facilitate criminal decision-making by their presence, flooding the individual with irrelevant emotion that demands immediate attention, moral emotions facilitate criminal decision-making by their absence. The neutralization (Sykes & Matza, 1957) of moral emotion leads to a purely rational choice with minimal input or guidance from the moral belief system. Hence, the individual is acting exclusively on the basis of rational considerations with minimal input from nonrational sources of information (i.e., empathy, compassion). Once moral emotion is deleted from the decision-making calculus we are left with a cold and calculated decision devoid of any moral considerations. There is no right or wrong, just that which is most expedient. A good example of this process is supplied by Earley (1992) in his book about life in Leavenworth federal penitentiary. In the book, an inmate by the name of Carl Bowles coldly recounts how after escaping from custody and nearly killing an FBI agent, he kidnapped an elderly couple, stole their car, took them to an isolated field, and executed them, all in an attempt to buy himself a few extra hours on the streets. It was a cold and calculated decision without any of the emotion or moral deliberation that guides a well-modulated decision. Still, in all, he felt the need to inform the couple just prior to executing them that he held no animosity towards them and hoped they felt the same way towards him.

Whereas reactive criminal thinking interferes with decision-making by stimulating irrelevant emotion, proactive criminal thinking (see Table 1) interferes with decision-making by inhibiting relevant emotion. It is postulated that each proactive thinking style is capable of neutralizing a different set of moral emotions. Hence, mollification is most adept at reducing guilt and remorse, entitlement is better at neutralizing empathy, power orientation is good for neutralizing shame, and superoptimism is best at neutralizing pride and fear (see Table 2). When a person decides to commit an act that conflicts with his or her moral belief system, he or she can use one of these thinking styles to reduce the moral emotion, which will then serve to reduce if not eliminate the conflict. Whether the individual is committing a crime or informing on a crime partner, the process is the same: dampen the moral emotion (guilt, shame, or pride) by accessing one or more proactive criminal thinking styles. Situational factors that threaten the individual's status or identity can also serve as an impetus for dampened moral emotions and neurodevelopmental factors that make it difficult for the individual to consider other people's feelings (weak empathy and perspective taking) add further to the neutralization process.

Once the moral emotions are eliminated, we are left with the utilitarian decision to commit or not commit a crime. Thus, dampening relevant moral emotions with proactive criminal thinking leads to a situation where rational choice is less than optimal. Psychopathic murderers are more likely to use cold-blooded logic in their decisions to murder someone, which contrasts sharply with the largely impulsive

Table 1: Descriptions of the Nine Thinking Styles

Thinking Style	Description
Reactive	**Impulsive, spontaneous, reckless, and hot-blooded cognitive approach**
Cutoff	Rapid elimination of deterrents through a single word or phrase
Cognitive Indolence	Lazy and haphazard thinking and general lack of critical reasoning
Discontinuity	Failure to follow-through on goals and plans; lack of consistency
Proactive	**Planning, plotting, scheming, and cold-blooded cognitive approach**
Mollification	Externalizing blame for own actions onto outside forces
Entitlement	Giving oneself permission to commit crime out of privilege/necessity
Power Orientation	Desire to control external factors, including other people
Superoptimism	Excessive pride in oneself and belief in lasting invulnerability

Source: Walters, 2012

Table 2: Excitatory and Inhibitory Effects of Criminal Thinking on Emotion

Thinking Style	Emotion	Effect	Temperament	Action
Reactive	Hedonistic	+	Disinhibition	
Cutoff				↑frustration ↑anger
Cognitive Indolence				↑urgency
Discontinuity				↑excitement
Proactive	Moral	-	Fearlessness	
Mollification				↓guilt ↓remorse
Entitlement				↓empathy
Power Orientation				↓shame
Superoptimism				↓pride ↓fear

Note. Thinking Style = higher-order (Reactive or Proactive) and specific lower-order thinking style (Walters, 2012); Emotion = emotion that the thinking style targets (hedonistic or moral); Effect = effect of thinking style on targeted emotion (+ = excitatory or - = inhibitory); Temperament = temperament dimension the thinking style derives from (disinhibition or fearlessness); Action = specific emotion each thinking style effects (↑ = raises, ↓ = lowers).

homicidal decision-making observed in non-psychopathic murderers (Woodworth & Porter, 2002). In addition, Beauregard, Rossmo, and Proulx (2007) used RCT to analyze the offense activities of 69 serial sex offenders. Employing qualitative data analysis, they determined that the hunting or predatory behavior displayed by these individuals followed nine phases, each of which involved specific cost-benefit calculations: offender and victim routine activities, choice of hunting ground, victim selection, attack location, luring strategy, crime location, crime method, and victim release location. What this suggests is that even the utilitarian method employed by RCT is limited if emotions that help guide decision-making are suddenly cut off or eliminated.

Bob's frustration has not only triggered hedonistic emotions but has also stimulated his proactive criminal thinking. In particular, he feels entitled to rob the bank because of the length of his previous sentence ("they kept me locked up for ten years, now they're going to pay"). He rationalizes

that he won't hurt anyone ("I'll use an unloaded gun") and revels in the prospect of having control over others ("I'll show them who's in charge"). Hence, the proactive criminal thinking styles of entitlement, mollification, and power orientation fuel the neutralization of moral emotion, which then increases the odds that Bob will follow through on his initial plan to rob the bank. It should also be noted that the hedonistic and moral belief systems are not independent any more than fearlessness and disinhibition or proactive and reactive criminal thinking are independent (Walters, 2012). The two components overlap and feed on one another, and so it is not unusual to find one component stimulating or activating the other.

The Decision Process

The premise of this article is that the crime-no crime decision begins as a cost-benefit analysis but requires the presence of relevant emotional information and feedback to be fully functional. Neutralization of moral emotion consequently makes the decision process less balanced as does the introduction of irrelevant hedonistic emotion. As shown in Figure 1, hedonistic and moral emotions are anticipated prior to the decision by way of hedonistic and moral expectancies. The role of affective expectancies in decision-making has been reviewed by Loewenstein and Lerner (2003) who concluded that these expectancies are central to the decision-making process. Situational and neurodevelopmental factors and criminal thinking styles, if present, act on these emotions, although it may be more accurate to say that the individual acts on these emotions via situational/neurodevelopmental factors and criminal thinking. The impact of situational and neurodevelopmental factors on hedonistic and moral emotions can either be overt or covert, and the effect of the criminal thinking styles on hedonistic and moral emotions can either be conscious (deliberate) or non-conscious (automatic). In the choices leading up to the bank robbery, Bob's decision-making was affected by situational factors (frustration over lack of progress in finding a job), neurodevelopmental factors (weak empathy), and a mixture of proactive (entitlement, mollification, power orientation) and reactive (cutoff, discontinuity) thinking styles.

When considering the rational/nonrational choice model, it is important to understand that proactive and reactive criminal thinking operate as overlapping dimensions rather than as distinct categories or types. This is because proactive and reactive criminal thinking frequently co-occur, even in the same criminal act. Bob decided to rob a local bank after several days of deliberation on the strength of a moderately antisocial moral belief system and an above average degree of proactive criminal thinking. During the robbery, he grew angry because the clerk did not hand the money over as quickly as he thought she should. This led to an assault (hitting the women with the handle of his pistol) brought on by a flood of reactive criminal thinking and irrelevant hedonistic emotion. The crime began as a robbery based on a cold-blooded utilitarian decision but soon devolved into an assault based on an emotionally charged impulsive decision. Situational and neurodevelopmental factors also overlap in that peer influence can stimulate hedonistic emotions (excitement) while simultaneously dampening moral ones (desire to be accepted by the group).

The two individuals with whom Bob decided to rob the bank were even more interested in committing the crime than Bob, pushing him to do it sooner than he planned. The stimulation of the hedonistic desire for excitement led to a concurrent dampening of moral and utilitarian considerations about waiting until a more opportune time to commit the robbery because he wanted to be accepted by these two individuals. Getting away with the crime initially and enjoying the fruits of this antisocial act ($10,000 split three ways, sense of power and excitement) reinforced the thinking that led to the decision in the first place, making it more likely that Bob would repeat the crime. In fact, he and his two crime partners committed another robbery three weeks later, but this time, they were caught as they left the bank.

Hypotheses

Much of what has been and will be presented in this paper has never been formally tested. To assist in evaluating the rational/nonrational choice model of criminal decision-making described in this paper, I have constructed a series of hypotheses. These hypotheses are designed to guide future research and provide feedback on the aspects of the model that should be retained, the aspects that should be rejected, and the aspects that need to be altered to make this a more complete explanation of crime than traditional RCT.

1. A bidirectional relationship is assumed to exist between the hedonistic and moral belief systems and both the decision to commit crime and the outcome of this decision such that feedback from decisions and outcomes shape belief systems as much as belief systems shape decisions and outcomes. It is consequently predicted that if a person were to make a decision inconsistent with his or her moral or

hedonistic belief system that this would lead to a corresponding change in the belief system (cognitive dissonance).

2. When placed in a stressful situation or exposed to frustrating life circumstances an individual will more likely make risky decisions and exhibit temporal discounting than when not placed in a stressful situation or exposed to frustration.

3. An individual who achieves an elevated reactive criminal thinking score will exhibit a greater tendency toward risky decision-making and temporal discounting than an individual who does not achieve an elevated reactive criminal thinking score.

4. When confronted by events that challenge his or her status or identity (e.g., disrespect), an individual will display weaker moral emotions than when his or her status or identity is not challenged.

5. An individual who achieves an elevated proactive criminal thinking score will exhibit weaker moral emotions than an individual who does not achieve an elevated proactive criminal thinking score.

6. Experimentally altering hedonistic expectancies will lead to changes in hedonistic emotions and decisions, whereas experimentally altering moral expectancies will lead to changes in moral emotions and decisions.

7. Increases in reactive criminal thinking will correlate positively with dopaminergic activity in the ventral tegmental area (VTA) and striatum and negatively with serotonergic activity in the hippocampus.

8. Increases in proactive criminal thinking will correlate negatively with activity in the orbitofrontal cortex (OFC) and amygdala and negatively with serotonin levels in both areas.

9. Because neuro-incentive systems develop more quickly than neuro-control systems, hedonistic emotions will be observed sooner than moral emotions developmentally, and reactive forms of criminal thinking will appear before proactive forms of criminal thinking.

10. Individuals who receive both skills training (interpersonal problem solving, anger management) and moral training (values clarification, moral reconation therapy) will experience significantly lower rates of subsequent recidivism than individuals receiving skills training alone or moral training alone.

Contrasting Proactive and Reactive Dimensions in Criminal Decision-making

A major assumption of the theoretical model presented in this paper is that proactive and reactive criminal thinking contribute equally to the criminal decision-making process even though they relate to different aspects of this process. Hence, while proactive criminal thinking is believed to neutralize moral emotions and reactive criminal thinking is said to stimulate hedonistic emotions, both are core elements of the criminal decision-making apparatus. Proactive criminal thinking facilitates the planned, predatory, and cold-blooded aspects of criminality, whereas reactive criminal thinking fosters the angry, impulsive, and hot-blooded aspects of criminality. The importance of these overlapping dimensions to the criminal decision-making process can perhaps best be illustrated by contrasting the current approach with theoretical models that focus on one dimension or the other.

Gottfredson and Hirschi's (1990) general theory of crime provides an exclusive reactive interpretation of the criminal decision-making process. According to the general theory of crime, criminal decision-making is a function of two factors: low self-control and opportunity. An individual with low self-control who is presented with a criminal opportunity is hypothesized to possess a high probability of engaging in criminal behavior. Although the general theory has helped shed light on a number of important aspects of crime and delinquency, it fails to take into account the fact that many offenders deliberately seek out and create opportunities for crime rather than sitting back and waiting for a criminal opportunity to materialize (Albanese, 2000). This is one reason why the general theory of crime is less of a general theory than its authors assert.

Tedeschi and Felson (1994) offer a different perspective on criminal decision-making in which all offending is held to be goal-directed or instrumental in achieving a particular outcome; in other words, it is exclusively proactive. Felson (1993) had previously rejected the proactive-reactive aggression breakdown in favor of a perspective that highlighted dispute-related and predatory behavior. The value of this perspective is that it demonstrates how crimes

long considered impulsive (e.g., domestic violence) can be at least partially instrumental or planned. The problem with this perspective is that it fails to take into account the fact that most offenders indicate that they did not plan their crimes (Feeney, 1986; Monahan, Marolla, & Bromley, 2005). Even Felson's own research shows that most state inmates serving time for violent offenses report that their crimes were unplanned and that planning is more commonly found in traditionally "instrumental" crimes like robbery than it is in more traditionally "impulsive" crimes like assault (Felson & Massoglia, 2012).

What the perspective presented in this paper offers beyond the exclusive reactive criminal decision-making perspective provided by the general theory and the exclusive proactive criminal decision-making perspective engendered by social interactionism is integration of the two dimensions. Gottfredson and Hirschi (1990) argue that opportunity is vital to criminal decision-making but fail to mention that offenders sometimes create their own opportunities. Teduchi and Felson (1994) contend that criminal decision-making is cognitively mediated, but fail to consider that there may be more than one cognitive dimension involved in this mediation. The traditional approach of focusing on the criminal event and trying to classify the behavior as proactive/instrumental or reactive/impulsive is inherently flawed because most crimes involve a combination of the two. What makes more sense is tracing the rational and nonrational aspects of the criminal decision-making process from their proactive and reactive criminal thinking roots to their expression in actual criminal behavior.

Implications of a Rational/Nonrational Choice Theory of Crime

A theory of rational/nonrational choice has potentially important implications for theory, research, practice, and policy.

Implications for Theory and Research

The present model builds on the strengths of RCT while attempting to rectify some of its greatest weaknesses. The strengths of RCT include the assumption that offending is determined more by proximal decision-making factors than by distal environmental factors and that a rational framework exists for decision-making of both an offending and non-offending nature. A principal weakness of RCT, as discussed in this paper, is that while its proponents acknowledge the bounded nature of rational thought, there has been little apparent attempt to integrate this knowledge into the theory itself. The perspective advanced in this paper is that criminal decision-making is composed of both rational and nonrational elements and these elements are influenced and shaped by both proximal and distal factors. It is further maintained that situational, neurodevelopmental, and criminal thinking factors play an important role in the criminal decision-making process. As such, the rational/nonrational choice model may have implications for some of the decision-based criminological theories mentioned in the opening paragraph of this article. It is capable of informing deterrence theory through an emphasis on subjectivity, belief that it is the person's perception of a sanction rather than the sanction itself that determines his or her response to the sanction, and notion that certain aspects of the deterrence doctrine (e.g., sanction severity) are more subjective than other aspects (e.g., sanction certainty). This may explain why deterrence tends to be specific to the crimes for which one has been punished and why sanction severity tends to be less effective than sanction certainty in deterring future crime (Loughran, Piquero, Fagan, & Mulvey, 2012). The current model also appears to have the capacity to expand on the proactive/predatory aspects of routine activity theory (Beauregard et al., 2007) and on the reactive/impulsive aspects of Gottfredson and Hirschi's (1990) general theory of crime.

Another theoretical/research implication of the rational/nonrational choice model is that it may provide useful information on the nature and role of callous/unemotional "traits" in childhood conduct disorder, juvenile delinquency, and adult antisocial behavior. Callous/unemotional (CU) traits have become a major topic of research and theoretical speculation in the areas of psychopathy and aggression. In addition, they are now included in DSM-5 (APA, 2013) as specifiers for conduct disorder based on the belief that disruptive children with CU experience significantly poorer outcomes than disruptive children without CU (Frick, Ray, Thornton, & Kahn, 2014). There is even speculation that CU is an inherited trait, and while this view is supported by twin studies, evidence of heritability is much weaker when genetic influence is estimated from DNA collected on unrelated individuals (Viding et al., 2013). The rational/nonrational choice model, by comparison, holds that CU tendencies may be as much a function of situational and cognitive (proactive criminal thinking) factors as they are of genetics (hypofunctioning amygdala and early fearlessness temperament) and as such, may be more amenable to change than has traditionally been thought. Plotting the relationship between CU scores from the Youth Psychopathic Traits Inventory (YPI: Andershed, Kerr, Stattin, & Levander, 2002) and

self-reported offending over the first six waves of the Pathways to Desistance study (with six months between waves: Mulvey, 2012) reveals that while CU scores were more stable than offending at each six-month interval (mean r = .57 vs. .45), cross-lagged correlations from offending to CU and from CU to offending were virtually identical (mean r = .25 vs. .24). What this means is that involvement in crime may have just as much impact on CU (desensitization effect) as CU has on crime (dispositional effect).

A third theoretical/research implication of rational/nonrational choice theory is that it may have value in explaining the well-documented but poorly understood relationship between age and crime. Cross-sectional as well as longitudinal studies on the age-crime relationship indicate that crime peaks between adolescence and early adulthood (ages 15 to 24 years) and then declines sharply thereafter (Steffensmeier, Allan, Harer, & Streifel, 1989). Hirschi and Gottfredson (1983) go so far as to assert that the age-crime relationship, which they characterize as a brute fact of criminology, is invariant across time, geography, culture, and a host of other criminologically relevant factors. Although this conclusion has been challenged (Steffensmeier & Harer, 1999), there have been few serious attempts to explain this relationship other than with biologically relevant changes in development (see Kanazawa & Still, 2000). Developmental differences between adolescents and adults in both neurophysiology and decision-making may be even more helpful in explaining this brute fact of crime. Because the dopamine reward system, of which the striatum is part, develops more rapidly than the control centers of the frontal cortex, particularly the orbitofrontal cortex, an adolescent has more irrelevant hedonistic emotion to contend with than an adult (Martin & Delgado, 2011), and because skills and propensities central to the development of empathy, such as the affective component of theory of mind, are still developing in mid to late adolescence, relevant moral emotions tend to be weaker in adolescents than they are in adults (Shamay-Tsoory et al., 2010). Situational factors that loom large in adolescence (i.e., peer pressure, identity formation) add further to the turmoil. It makes sense, then, for individuals to cut down on their offending or desist altogether as they move from adolescence to adulthood and begin viewing themselves and the world differently.

Implications for Practice

The problems adolescents face when trying to keep irrelevant hedonistic emotions from intruding on their thinking and decisions are well-known. What, we may ask, is the reason for this? Research shows that the incentive to pursue appetitive goals grows more rapidly in adolescence than the ability to modulate and control this drive and its associated hedonistic emotions (Blakemore & Robbins, 2012). Other research indicates that dopamine drives the appetitive incentive/reward system and serotonin modulates the effect of dopamine on behavior (Soderstrom, Blennow, Sjodin, & Forsman, 2003). It stands to reason, then, that medications designed to increase the action or supply of serotonin at the receptor site may be helpful in controlling impulsive behavior. This, in fact, is exactly what has been observed in several studies. Even though the results are far from conclusive, Specific Serotonin Reuptake Inhibitors (SSRIs), drugs that increase the action of serotonin by blocking its reuptake (e.g., Prozac, Paxil, Zoloft), have been found to reduce both impulsivity and aggression in a fair number of youthful offenders and psychiatric patients (Butler et al., 2010; Walsh & Dinan, 2001). Reports of adverse reactions to SSRIs, such as akathisia and anxiety upon initial administration of some of these medications, though atypical, are well documented (Healy, Langmaack, & Savage, 1999). More severe reactions, such as suicide and homicide, have been insinuated in the popular press but are exceedingly rare and difficult to substantiate, being based on anecdotal evidence and ex post facto clinical case studies rather than on well-designed double-blind placebo-controlled research (Walsh & Dinan, 2001). Just to be safe, drug manufacturers now recommend close monitoring of youth placed on SSRI medications for depression or aggression, particularly during the early stages of drug administration.

Medication is not the only way to assist adolescents struggling with high levels of hedonistic emotion. Psychological interventions can be just as effective, if not more effective, than medication in managing excessive levels of hedonistic emotion, aggression, and antisocial behavior. Training in interpersonal problem solving, anger management, and social skills have been found effective in reducing impulsivity, aggression, and criminality in seriously delinquent youth (Lipsey, Wilson, & Cothern, 2000). One concern, however, would be that by teaching youth how to more effectively solve their problems with principles borrowed from RCT, we are only addressing part of the problem. Walters (2009) discovered that anger management training effectively reduced reactive criminal thinking but not proactive criminal thinking in a group of adult male medium security prisoners completing a six-week anger control program. By teaching juveniles techniques designed to keep hedonistic emotions in check we may be inadvertently teaching them how to excel at emotionless, callous decision-making. The solution is not to stop teaching offenders problem

solving and anger management skills but to supplement these interventions with evidence-based programs designed to teach cognitive-moral skills through values clarification, moral reasoning, and moral reconation therapy (Wilson, Bouffard, & MacKenzie, 2005) and empathy skills through role-playing (Goldstein & Winner, 2012). This way, hedonistic emotions can be properly modulated, and moral emotions can be effectively incorporated into one's decisions, both of which will reduce the odds of a criminal decision.

Implications for Policy

Just because criminal decision-making has nonrational elements does not mean that the individual is absolved of responsibility for making these decisions. From both a legal and ethical standpoint, the individual is responsible for the decisions he or she makes, whether the decision is based purely on rational, purely on nonrational, or on a mixture of rational and nonrational considerations. The rational/nonrational model of criminal decision-making described in this paper takes a non-deterministic view of human behavior and explains how proximal criminal thinking patterns impact on behavior by influencing the decision-making process. Situational, developmental, and biological factors do, in fact, help shape the behavior of individuals, but the individual, unless he or she is suffering from a mental or physical defect that precludes him or her from understanding the wrongfulness of his or her actions, is responsible for the consequences of all the decisions he or she makes. From a policy standpoint, choice rather than determinism is the foundation upon which the criminal justice system is based, even if the choice is not rational according to the principles of RCT.

There is ample evidence that "get tough" policies on crime rarely work (Clear, 1994). This has not stopped politicians and policy makers from continuing to pursue this simplistic approach to crime prevention, however. Situational crime prevention techniques focus on proximal rather than distal relationships between variables and could benefit from a theory, like the one presented in this paper, where affect and emotion are emphasized. It may even be possible to enhance situational crime prevention by making it more difficult for offenders to neutralize guilt feelings—thereby making crime less rewarding—through evidence-based mass media campaigns and public reminders. A growing number of policy makers are beginning to appreciate the importance of evidence-based strategies for crime control (MacKenzie, 2000). Pratt (2008), states that criminologists and criminal justice experts must share part of the blame for not having presented their data in ways that can be readily understood by policy makers. Two of Pratt's (2008) recommendations are to keep academic jargon to a minimum and highlight the relevance and importance of research findings to politicians, administrators, and policy makers interested in public safety.

Conclusion

The current paper introduced the reader to a hybrid model of decision-making that seeks to integrate the rational and nonrational elements of choice. As was noted at the beginning of this paper, RCT has contributed to our understanding of crime but suffers from several noteworthy limitations. One such limitation (minimal attention to the affective and emotional components of criminal decision-making) was the primary focus of this paper and became the foundation for a rational/nonrational theory of criminal decision-making. The hedonistic aspect of the current model highlights the benefits to be derived from a particular action, whereas the moral aspect highlights the potential costs of these same actions. The value of a mixed cognitive-emotive model is that emotions can provide valuable information to the decision maker in a manner that is more efficient than pure cognition. This, of course, assumes that (1) the hedonistic emotions are being adequately modulated by cognition and serotonin, (2) the hedonistic emotions are not being overstimulated by stressful/frustrating life events or reactive criminal thinking, (3) the moral emotions are well articulated, and (4) the moral emotions are not being inhibited by status-identity concerns or proactive criminal thinking.

Understanding the nature of criminal decision-making may provide insight into how people make decisions in general (i.e., biological as well as environmental factors; costs as well as benefits; proximal as well as distal inputs; guided by emotion as well as by cognition). It also highlights the need for a system of well-modulated hedonistic emotions and well-articulated moral emotions. The insight to be gained from such an approach can then be used to identify areas and issues in need of attention by those tasked with conducting interventions for youthful and adult offenders: namely, the situational, developmental, and criminal thinking influences that interfere with balanced decision-making. The current model goes beyond Cornish and Clarke's (1985, 1986) normative model and the notion of "good enough" theory (Wortley, 2014) to provide a descriptive model that integrates rational and nonrational components from RCT, psychological and economic theories of choice, and criminal lifestyle theory. Because only isolated aspects of this

model have been tested thus far, and then only partially, research is required to more fully assess the model and the theory upon which it is based. Ten hypotheses were accordingly offered (see pages 19-21) in hopes of jump-starting this process. Only through hypothesis-guided research will we be in a position to determine whether the ideas presented in this paper add anything new to our understanding of crime, criminals, and the criminal decision-making process.

In closing, I think it is important to acknowledge that this paper was not designed to provide a complete analysis or review of the literature on criminal decision-making. To adequately review each of the major components of the decision-making model proposed in this paper (linking emotion to choice, neuroanatomical underpinnings, developmental context, role of temperament, hedonistic emotions and expectancies, moral emotions and expectancies, and proactive and reactive criminal thinking) would have required at least seven different papers, each longer than the one presented here. I had to decide, therefore, whether to focus in detail on one aspect of the model or provide a broad overview of the entire model. I choose to do the latter because I felt it would be more useful to present the entire model rather than just one aspect at this point in time. By necessity, then, the literature review was selective and limited, though attempts were made to keep it as unbiased and balanced as possible. Future attempts to evaluate, expand, and elaborate on this model should start by reviewing each element of the model and examining the inter-relationships between elements, guided, in part, by the ten hypotheses outlined in this paper.

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About the Author

Glenn Walters started teaching for the Department of Criminal Justice at Kutztown University in Kutztown, Pennsylvania in 2011. Prior to this, he worked as a clinical psychologist and drug program coordinator for the U.S. Army and Federal Bureau of Prisons for 29 years. At Kutztown, he teaches courses in offender management, substance misuse and crime, and research methods. Dr. Walters has written over 250 articles, books, and book chapters and has published in a wide variety of criminology, criminal justice, and psychology journals. His current research interests include offender assessment, drug-involved offenders, mediation and taxometric analysis, and development of an overarching theory of criminal lifestyle.