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Darwinian Foundations of Crime and Law

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Abstract

Darwin's theory of evolution by natural selection provides a powerful meta-theoretical framework that has the potential to unify and energize research in the social sciences just as it has the biological sciences and the field of psychology. A rapidly growing body of research in the field of evolutionary psychology has documented the importance of evolutionary forces in shaping patterns of human cognition and behavior. The process of natural selection is proposed to have shaped many behaviors that represent crimes in modern societies, such as murder, assault, rape, and theft, to address ancestrally recurrent conflicts between individuals. The cost-inflicting strategies that we recognize as crimes may have been favored by natural selection when they gave individuals an advantage in competition for scarce, reproductively relevant resources. An exploration of the precise nature of the ancestrally recurrent conflicts for scarce, reproductively relevant resources and how natural selection can operate to produce adaptive changes in individuals helps to elucidate the cognitive and behavioral mechanisms that evolved to address resource competition. An evolutionary forensic psychology represents the beginning of a revolution of thought and discovery that will bring us closer to the true nature of individuals, societies, morality, crime, and what our laws are capable of doing.

Key Words: Darwinian natural selection; evolutionary psychology; crime

Darwinian Foundations of Crime and Law

Forensic psychology is a burgeoning field in the social and behavioral sciences. It explores the application of the science and the profession of psychology, including questions and issues relating to the law and legal systems. Research and practice in forensic psychology have been approached from a range of theoretical perspectives, from psychoanalytic to socio-cultural. It also has explored issues ranging from the components of the criminal mind to the origins of rules that govern the structure of societies. Despite these achievements, however, differences in theoretical perspectives in forensic psychology have led to a splintered and incomplete treatment of the field.

Darwin's (1859) theory of evolution by natural selection is the theoretical framework that unifies the field of biology. It unites research and understanding of the development, control, and organization of behavior. It informs domains of research, including communication, territoriality, parenting, and social behavior. The study of humans, which includes all of the social sciences, is part of the field of biology. Evolutionary forensic psychology is a necessary step toward a unified and complete understanding of psychology, crime, and the law.

Why *Evolutionary* Forensic Psychology?

Evolutionary psychology uses an adaptationist approach to explore the cognitive foundations of behavior. Over the ancestral history of humankind, individuals faced specific recurrent problems, generation after generation, that affected how long they survived, how well they lived, and, of greatest relevance for natural selection, how successful they were at reproducing. Some individuals had characteristics that made them better able to solve these problems than others. The better problem-solvers were more likely to survive and reproduce. When there was a heritable basis for characteristics contributing to better adaptive problem-solving, the genes that contributed to the development of those characteristics were passed on in greater numbers than the genes coding for less successful characteristics. A beneficial characteristic providing even a 1% advantage in reproduction (fitness advantage) over other, less beneficial characteristics could completely replace the poorer characteristics in a few thousand generations (Nilsson & Pelger, 1994). Over the millions of generations of evolutionary history,

characteristics that helped individuals to solve recurrent problems that affected their fitness were gradually sculpted into functional adaptations by the process of natural selection.

Evolutionary processes undoubtedly shaped physiological characteristics to help solve recurrent problems of survival and reproduction. The skin is well adapted to protecting the vital organs beneath from injury and infection. The lungs, with their vast surface area and moist membranes, are marvelous adaptations for extracting oxygen and releasing carbon dioxide. The heart is a powerful pump that functions to circulate oxygen and other nutrients to cells throughout our bodies. Just as selection shaped physiological adaptations with specific problem-solving functions, it also shaped the structure of thoughts, preferences, desires, attitudes, and emotions to guide behaviors toward solving historically recurrent problems that affected reproductive fitness. The adaptationist approach used by evolutionary psychologists uses knowledge of recurrent ancestral problems to generate hypotheses about the functions and forms of cognitive mechanisms in human minds and to better understand observed patterns of cognition and behavior.

Humans do not have specialized horns for fighting rivals or teeth for incapacitating prey. Instead, our minds house a large complement of specialized cognitive adaptations that coordinate patterns of behavior capable of solving such problems. Tooby and DeVore (1987) argue that humans occupy the “cognitive niche” in earth’s ecosystems. They propose that our place in this unique niche is largely the result of the importance of social interaction over the course of human evolutionary history. Cooperating with others can facilitate solving adaptive problems. However, sociality can also lead to conflict. There would have been significant selection pressure over human evolutionary history in favor of strategies that coordinate cooperation with others in contexts in which working together was more beneficial than going it alone (Trivers, 1971), such as hunting large game, building shelter, and defending against attacks from rival groups. There also would have been significant selection pressure for the evolution of strategies to best others in contexts of conflict over scarce resources (Buss & Shackelford, 1997a; Duntley, 2005), including competition for attractive mates and territories.

One general strategy for winning contests over limited resources is inflicting costs on rivals. Damaging rivals in competition for resources makes the net benefit of controlling the resources lower for them. Inflicting enough damage can make the costs of competition for a scarce resource exceed the benefits of controlling the resource, at which point the prudent strategy may be to disengage from competition, leaving the resource under the control of the cost-inflicting individual. The potential benefits of cost-inflicting strategies in contexts of competition for resources would have created selection pressure for the purposeful infliction of costs as a strategy to outcompete rivals. A special set of adaptations may have evolved for this purpose in psychopaths (Lalumiere, 2001; Mealey, 1995; Pitchford, 2001).

Several sources of conflict between individuals have been recurrent over human evolutionary history. Understanding the nature of recurrent conflicts in our evolutionary past can provide us with insight into conflicts between people today. In what follows, we explore some of the most important sources of conflict for our ancestors and briefly discuss their implications for evolutionary forensic psychology.

Interindividual Conflict

Conflict over Status. One broad context of conflict between individuals is the struggle for status. All available evidence indicates that men who are high in status have sexual access to a greater number of women than do men who are low in status (Betzig, 1993; Buss, 2003a; Hill & Hurtado, 1996; Perusse, 1993). Men who are high in status also are more likely than their low-status rivals to seek out younger and more fertile women (Grammer, 1992) and to marry women who are more attractive (Taylor & Glenn, 1976; Udry & Eckland, 1984). An individual in a group cannot ascend a status hierarchy without displacing someone above, bumping that person to a lower position and inflicting costs associated with status loss. The potential for large fitness gains associated with increases in status would have generated selection pressure for specialized cognitive adaptations that lead to hierarchy ascension and other cognitive mechanisms to prevent large status falls. Because a greater number of mating opportunities enhances the reproductive success of men more than that of women, men should engage in more status striving. Research across the life span has found this to be the case, with men placing greater importance

on coming out ahead and women focusing more on maintaining social harmony (Maccoby, 1990; Pratto, 1996; Whiting & Edwards, 1988).

Conflict over Material Resources. A second context of ancestrally recurrent conflict was fighting to control material resources, specifically resources that helped to solve recurrent adaptive problems. Such resources included territory, food, weapons, and tools. There also was conflict to gain the favor of individuals who were the suppliers of material resources, examples of which include the conflict between siblings for investment from their parents and elder kin (Parker, Royle, & Hartley, 2002) and conflict between women for access to men with resources (Buss, Larsen, & Westen, 1996; Buss, Larsen, Westen, & Semmelroth, 1992). In general, the scarcer and more valuable the resource in terms of its contribution to an individual's reproductive success, the greater the conflict should be between individuals over access to the resource.

Conflict over Mating Resources. Whereas the minimum obligatory parental investment for women is nine to 10 months, the minimum investment for men can be as small as a few hours. Because women's minimum investment in reproduction is greater, the costs of a poor mate choice are greater for women than for men (Trivers, 1972). As a result, there is conflict between the sexes about the timing of sexual activity. Because sex is less costly for men than for women, they desire sexual activity much earlier in a relationship than do women (Werner-Wilson, 1998). Men also desire a greater number of sexual partners than do women (Schmitt, Shackelford, Duntley, Tooke, & Buss, 2001) and are more amenable to short-term, uncommitted sex (Buss, 2003a). Female prostitution is hypothesized to be an outcome of these male propensities (Burley & Symanski, 1981; Buss, 2004; Buss & Schmitt, 1993; Kruger, 2008). The differences in men's and women's sexual desires are a clear source of evolutionarily recurrent conflict between the sexes (Buss, 1989; Buss, 2000; Buss & Shackelford, 1997b)

There also is conflict within each sex for access to members of the opposite sex. Women are biologically limited in the number of offspring they can have in their lifetime. In contrast, men are limited reproductively only by the number of females they can impregnate. Given an equal sex ratio, men who impregnate more than one woman or who have more than one long-term partner at any time effectively

deprive same-sex rivals of potential mates. Human polygynous mating systems, in which some males may have more than one mate at a time, lead to greater reproductive success for those men and zero reproductive success for many others. Over evolutionary time, the greater reproductive variance among men selected for more extreme male strategies to acquire mates. Daly and Wilson (1988) argue that “risky strategies” such as the use of violence are an outcome of this unique selection pressure on men. Over evolutionary time, men who failed to take risks would have been at a disadvantage in competition for mates and, therefore, less likely to leave descendants (Daly & Wilson, 1988; Kruger & Nesse, 2004; Wilson & Daly, 1985)

Conflict and Kin Selection

Evolutionary researchers have documented that conflict is usually tempered by genetic relatedness. Genetic relatives are less likely to experience conflict over resources than are nonrelatives. Closer genetic relatives do not experience conflict as often as or to the degree that more distant relatives do (see Buss, 2004, for a review). This is argued to be the evolutionary product of kin selection. According to kin selection theory (Hamilton, 1963; Maynard Smith, 1964), humans and other organisms have evolved to act more favorably toward their genetic relatives than toward nonrelatives. If genes that code for altruism exist in an individual, they also are likely to be present in the individual’s genetic relatives. Natural selection would favor behaving altruistically toward genetic kin who can convert that investment into reproduction, which translates into the production of additional copies of shared genes.

Daly and Wilson (1988) applied the logic of kin selection theory to family relationships. They hypothesized that genetic relatedness results in a special kind of family bond. Genetic relatives, they argue, should behave more altruistically toward one another than family members who are not genetically related, such as stepparents and stepchildren. Stepfamily members should be in greater conflict with each other than genetic family members because step-kin do not share any genes. To test their hypothesis, Daly and Wilson secured homicide records from the United States and Canada. They discovered that children are between 40 and 100 times more likely to be murdered when they reside in a home with a stepparent than when residing with two genetic parents. Adult children also are more likely to kill a stepparent than a

genetic parent. Daly and Wilson propose that the greater conflict between stepfamily members is produced by an activation failure of psychological mechanisms that generate closeness between genetic relatives.

Specific Cost-Inflicting Strategies to Outcompete Rivals

Theft. One strategy of cost infliction that may be used to gain an advantage in competition for resources is theft (see Cohen & Machalek, 1988) or otherwise cheating rivals out of their resources. A valuable weapon can be stolen and used against its owner. Valuable territory can be encroached upon and its vegetation, water, shelter, and wildlife exploited (Chagnon, 1983). Mates can be poached from an existing relationship (Buss, 2000; Buss, 2003a; Schmitt & Buss, 2001). Public knowledge that a person has been cheated or had valuables stolen also can affect the individual's reputation. The person may be viewed by others as someone who is easy to exploit, increasing the likelihood that others will attempt to cheat or steal from the person in the future (Buss & Duntley, in press). An easily exploitable person will likely be less attractive to members of the other sex. In short, cheating and the theft of resources can be effective strategies of cost-infliction for the gain of reproductively-relevant resources, including material resources and status (Brannigan, 1997; Kanazawa & Still, 2000; Walsh, 2000)

Vigilance and Violence in Romantic Relationships. Buss and Shackelford (1997b) found that men and women engage in tactics that range from vigilance to violence to defend their relationships. Fueled by jealousy, an emotion absent from contexts of material-resource theft, men's tactics of defending against mate poachers were found to be different from women's. Men are more likely to conceal their partners, display resources, and resort to threats and violence, especially against rivals. Men also are more likely to use tactics of submission and self-abasement, groveling or promising their partner anything to get her to stay. Women are more likely to enhance their appearance and to induce jealousy in their partners, demonstrating their desirability by showing that they have other mating options available to them. When these tactics fail to resolve conflicts between men and women in romantic relationships, both partners may resort to the use of aggression (Buss & Shackelford, 1997b; Daly & Wilson, 1998; Buss, 2005; Shackelford & Goetz, 2004; Shackelford & Mouzos, 2005).

Rape. Rape is a strategy aimed directly at obtaining reproductive resources at a cost to the victim. A male rapist may benefit from the behavior by siring offspring that he may not have otherwise produced. Not only does rape inflict terrible emotional (Block, 1990; Burgess & Holmstrom, 1974) and physical costs (Geist, 1988) on women, it also inflicts fitness costs by bypassing female mate choice (Buss, 2004). Although scholars have commented that there is not enough evidence to determine conclusively whether men have specialized adaptations to commit rape (Buss, 2003a, 2004; Symons, 1979), ethnographies and historical records suggest that rape occurs cross-culturally and was recurrent over the deep time of our evolutionary history (Buss, 2003a).

Violence and Homicide. Unlike some other strategies of inflicting costs, violence and homicide are hypothesized to help address a wider range of contexts of conflict between individuals. Violence can be used to damage the status of a competitor or as an instrumental measure to facilitate theft. Homicide can free resources from the control of a rival or permanently eliminate cost-inflicting competitors.

Using violence to injure rivals can be an effective strategy to remove them from competition for a valuable resource. A healthy individual can compete more effectively than the rivals he injures. Competitors may be more likely to avoid or to drop out of competition with an individual who has injured them in the past. An individual who is capable of inflicting greater injuries to his competitors than they can inflict on him may gain a reputation of being difficult to exploit. This reputation may protect an individual against violent confrontations and grant him easier access to resources with less resistance from competitors.

Daly and Wilson (1988), among others (Chagnon, 1988; Ghiglieri, 1999), have documented that violence and homicide can be outcomes of intrasexual competition. Competition for mates (Buss, 2000; Weekes-Shackelford, Shackelford, & Buss, 2003), competition for status (Daly & Wilson, 1996; Shackelford, 2005), and competition for resources (Daly & Wilson, 1988; Kruger & Nesse, 2004) have been documented to be sources of violent conflict with the potential to lead to homicide. Even homicides that result from seemingly trivial altercations between two individuals who did not previously know one another can be understood through the lens of evolutionary psychology (Buss, 2005; Daly & Wilson,

1988; Ghiglieri, 1999). For much of our evolutionary history, social reputation carried long-term repercussions that are largely missing from modern societies. An individual's social sphere was smaller in the ancestral past, typically consisting of several dozen individuals. The winner of confrontations would garner a reputation as someone who should not be trifled with, and thus would have fewer battles to fight in the future. The loser would garner a reputation as a person who can be exploited and would either have to fight again or cede his resources in future conflicts (Buss, 2005; Daly & Wilson, 1988; Chagnon, 1988).

Coevolution

From an evolutionary perspective, most crimes can be understood as strategies that are designed to benefit the criminal at a cost to the victim. Evolutionary theories of crime are fundamentally coevolutionary theories of adaptations that produce criminal behavior and counteradaptations to defend against being victimized (Buss & Duntley, 2006; Duntley, 2005).

Antagonistic coevolutionary arms races are part of the evolutionary history of all species. They can occur between species, such as the lynx and the hare, or within species between competing adaptations in contexts of social conflict. Such coevolutionary arms races likely have produced a large number of complex adaptations. They can create massive selection pressures capable of producing rapid evolutionary change (see Altizer, Harvell, & Friedle, 2003; Phillips, Brown, & Shine, 2004).

The Fitness Costs of Being Victimized. Victims of crime often incur fitness costs. Individuals who are victimized are at a competitive disadvantage to those who are not. A victim of homicide provides an extreme example. A murder victim's death has a much larger impact on his or her inclusive fitness than just the loss of the genes in the person's body. Death by homicide often has cascading deleterious effects on a victim's inclusive fitness, including (a) the loss of future reproduction; (b) damage to existing children from lack of protection and investment; and (c) damage to the victim's extended kin group from diminished investment and a reputation for being exploitable.

A murder victim's fitness losses can be translated into rivals' fitness gains. The residual reproductive and parenting value of the mate of a homicide victim may go to a rival, often at the expense

of the victim's children with that mate, who may become stepchildren, a condition associated with an increased risk of abuse and homicide (Daly & Wilson, 1988). The murder of a man or woman creates an opening in a social group's hierarchy into which a rival can ascend. The children of rivals who had two surviving genetic parents would thrive relative to the victim's children, who would be deprived of the investment, protection, and influence of the genetic parent who was killed.

Victim Defenses. The great costs resulting from being the victim of crime would have selected for adaptations to (a) avoid being victimized; (b) punish conspecifics who damage individuals' inclusive fitness by inflicting costs on others, their genetic relatives, mates, or coalitional allies; and (c) eliminate or otherwise render impotent individuals who presented a persistent threat of inflicting costs in the future on the larger social group of which an individual, his kin, and his coalition are a part (e.g., psychopaths, hostile members of other groups). Inflicting costs on cost-inflicting rivals, including murdering them, is hypothesized to be part of an evolved strategy to avoid or stanch the inclusive fitness costs of being victimized by another individual or group (Buss & Duntley, in press, 2006; Duntley, 2005; Duntley & Buss, 2005).

To avoid being victimized, intended victims must be attentive to cues indicative of situations in which someone might benefit from inflicting costs on them. If particular crimes recurrently occurred in response to predictable sets of circumstances over our evolutionary history, selection would have favored defense mechanisms capable of recognizing those circumstances and motivating attempts to change or to avoid them. The evolution of such defense mechanisms, in turn, would have selected for strategies that could circumvent the evolved defenses. In this way, adaptations to avoid being victimized would have served as selection pressures for the refinement of adaptations for inflicting costs over evolutionary time. These new cost-inflicting adaptations would have selected for further refinements in defense adaptations—cost-infliction and defenses against victimization locked in a perpetual, antagonistic, coevolutionary arms race across generations, as illustrated in Figure 1.

Demonstration of the existence of crime-specific defenses against victimization that appear to have been designed to defeat corresponding criminal strategies would provide evidence that (a) the crime

was likely a recurrent feature of ancestral environments, (b) the criminal strategy occurred in predictable patterns over our evolutionary history and, therefore, (c) there may be adaptations specifically to motivate the crime. The greater the corresponding specificity of evolved design in the psychologies of crime and defenses against crime, the stronger the evidence that the two have had a coevolutionary relationship, and the greater the support for the existence of adaptations for criminal behavior. These and other aspects of criminal and victim adaptations have been explored elsewhere (DeBecker, 1998; Duntley, 2005).

There are no perfect solutions to any adaptive problem. Every adaptation is a compromise between the numerous different adaptive problems an organism faces. At the same time an individual selection pressure operates to shape or to refine an adaptation in a certain direction, other selection pressures push and pull on the evolutionary trajectory of its form and precise function, diverting it away from its optimal course for any single adaptive problem. It is unlikely that there would be enough stability in the selection pressures of a coevolutionary arms race, in combination with the selection pressures from other adaptive problems of survival and reproduction, for any perfect adaptive solutions to evolve. Therefore, it is unlikely that the adaptations that produce criminal behavior and adaptations to defend against being victimized will lead on every occasion to the outcomes for which they were designed. For selection to favor them, adaptations need only lead to greater reproductive success than competing designs *on average* across the individuals in a population who possess them over evolutionary time.

Coevolutionary arms races may involve the competing interests of more than two individuals. This is particularly apparent in contexts involving mating (Buss, 2003b). Coevolutionary arms races involving more than two individuals can occur, for example, when a woman who is married to one man becomes interested in another man. There is selection pressure on the woman to be faithful to her husband so as not to lose his investment or risk violent retaliation for her affair. There also is selection pressure on the woman to obtain better or different genes from those possessed by her husband or to acquire additional investment from another man. Female adaptations to engage in infidelity in some contexts would select for male adaptations to stanch women's infidelities, especially when a man and woman are in a long-term mating relationship. One hypothesized male adaptation for dealing with infidelity is to

inflict costs on the woman in the form of violence, stalking, marital rape, or even homicide [here add 2 or 3 references].

Female adaptations that produce infidelity in certain contexts would select for adaptations in men who are not the woman's long-term mate to lure or to aid women in being unfaithful. These male adaptations that promote female infidelity would, in turn, generate selection pressure on men's long-term mating psychology for adaptations to prevent other men from poaching away their long-term partners, including the infliction of costs on the would-be mate poacher, the unfaithful mate, or both. Any adaptation that results from what Buss (2003b) refers to as "triadic coevolution" is shaped by selection pressures created by the adaptations of the two other individuals involved, as illustrated by Figure 2. Newly evolved psychological mechanisms that benefit any one individual in the triadic relationship impose new selection pressures on both of the other individuals. Adaptations in long-term male partners that lead to cost-infliction as a strategy for dealing with a partner's infidelity, for example, would select for defense adaptations in both romantic partners and poachers. One possible evolved defense against being victimized is to anticipate victimization and preemptively inflict costs on the would-be victimizer, which is hypothesized to factor into the decisions responsible for motivating or inhibiting cost-inflicting behaviors deployed by men who discover that their partners have been unfaithful.

The Importance of Time and Opportunity. Time is hypothesized to be an important component of selection pressure on the psychology of criminal behavior in at least two ways. First, the time available to solve a problem may increase or decrease the likelihood that criminal behavior will be chosen as a solution. The amount of time that people have to react to different adaptive problems varies from situation to situation. Solutions to adaptive problems also vary in terms of how much time they require to be enacted effectively. Individuals capable of estimating accurately the amount of time available to solve a given adaptive problem would have had a selective advantage over competitors without such abilities (Buss & Duntley, in press). Estimates of the amount of time available to solve a problem and the amount of time required to enact different adaptive solutions would have been a source of input for making decisions about which adaptive solution is chosen.

There were likely recurrent contexts of conflict between people that had both a very large potential fitness impact and a narrow time frame in which to enact a solution. Such situations could have selected for some of the risky, cost-inflicting strategies we label as crimes. Examples may include homicides that are committed in self-defense. A woman who is cornered in the kitchen by her abusive husband may reach instinctively for a knife to defend her life by ending his. In such situations, homicide may not be the most beneficial solution to the problem, but it may be most effective of available alternatives that can be enacted in a narrow slice of time.

The presentation of rare opportunities that put cost-inflicting competitors at a significant disadvantage in highly fitness-relevant situations, if recurrent, could also have acted as selection pressures for the adoption of risky, criminal strategies (Buss & Duntley, in press). For example, a man who walks in on his wife and a rival in the act of having sex is simultaneously assaulted with an extremely significant adaptive problem and presented with a rare situation. The rival is naked and distracted, making him vulnerable to attack. The husband may never again have the rival at such a disadvantage. It would be surprising if selection did not fashion adaptations to employ cost-inflicting strategies, including homicide, to exploit such rare opportunities.

There also may have been recurrent adaptive problems involving social conflict that required a *greater* amount of time to enact effectively a strategy involving criminal behaviors (Buss & Duntley, in press). Cost-inflicting strategies that require the coordination of the efforts of multiple individuals require more time to deploy than strategies perpetrated by one person. Examples include contexts of coalitional aggression or tribal warfare. The raids of rival groups perpetrated by the Yanomamo to kidnap women and to capture resources (Chagnon, 1988) could not be successful without coordination, which requires a larger window of time than many situations in which individuals commit single murders.

A second way that time could have been an important selection pressure for the evolution of adaptations that produce criminal behavior stems from the importance of responding to costly assaults from others in a timely fashion (Buss & Duntley, in press). For example, there are clear time limits on the effectiveness of strategies for seeking revenge. Waiting too long to avenge a perceived wrong can

decrease the effectiveness of vengeance in two ways: first, by allowing more time for a reputation of being exploitable to grow, and second, by opening a larger window during which exploitation can occur. Reputation may be an asset that is best defended by striking while the iron is hot. Inflicting costs on the individual who is the source of reputational damage is hypothesized to be one effective strategy for the defense of reputation (Buss, 2005; Chagnon, 1988). Obtaining revenge may decrease a rival's ability to inflict costs in the future and clearly signals to other rivals the price they will pay for similar transgressions.

As proposed by Buss and Duntley (in press), adaptations that produce criminal behavior comprise a suite of mechanisms designed not only to inflict costs but also to deal with the probable consequences of victimizing someone. Inflicting costs as the solution to a primary adaptive problem is likely to create secondary problems, such as retribution from victims and their genetic relatives. The recurrent costs of secondary problems would have created selection pressure for the evolution of secondary solutions to those problems. Some secondary solutions would be best employed after the secondary problems they created. For example, a criminal could take steps to (a) cover up the crime, (b) subsequently avoid victims and their genetic relatives, (c) threaten to inflict additional costs on them, (d) actually inflict costs on them if they attempt to retaliate, or (e) marshal a formidable coalition to render the costs of avenging the crime greater than any benefits. Other secondary solutions may be more appropriately adopted before the primary solution involving the infliction of costs takes place. For example, an individual who may, in the future, adopt a strategy that includes cost-infliction could try to impugn the status and reputation of the person he or she intends to victimize. An intended criminal might also attempt to drive wedges between would-be victims and the kin and coalitional allies who would pose the greatest threat of helping the victims seek revenge, thus eliminating or decreasing the magnitude of secondary problems that will likely result from inflicting costs on victims. These ideas are illustrated in Figure 3. Adaptations for inflicting costs could use information about the effectiveness of secondary solutions employed in anticipation of the secondary problems that cost-infliction will create as a source of input for the cost-benefit decision processes that determines whether to pursue one particular criminal strategy over another, or to do

something else. In addition, if secondary solutions employed before a cost-inflicting strategy in particular contexts were recurrent over evolutionary time, selection should have operated on victims' defense adaptations to recognize the secondary solutions and motivate people to take action to avoid or to prevent the criminal behavior.

Implications of Adaptationist Research on the Psychology of Crime

The adaptationist approach outlined in this article has great promise to improve our understanding of a range of cognitive and behavioral phenomena. Evolutionary theory provides a powerful set of tools for exploring the functions of psychological mechanisms. It suggests specific, novel hypotheses and provides a logical framework that opens and unites data sources not routinely utilized in psychological research (e.g., comparative, ethnographic, bioarcheological).

If it turns out that cognitive mechanisms that produce criminal behavior are biologically engrained in the human psyche, it does not mean that we should be more tolerant of crime because people “can't help themselves.” We are not tolerant of a number of behaviors that humans may be biologically disposed to engage in, such as infidelity, spousal violence (Buss, 2000), and violence toward stepchildren (Daly & Wilson, 1988). In fact, there is substantial evidence to suggest that morality itself has evolutionary roots (see Cronk, 1994; Kirkpatrick, 1999; Krebs, Denton, & Wark, 1997; Pinker, 2002; Wright, 1995). The existence of adaptations that motivate criminal behavior also does not mean that crime is inevitable. Research on homicidal fantasies, for example, demonstrates that the vast majority of murder fantasies are not translated into homicidal reality (Kenrick & Sheets, 1993). Jones (1997) argues that our system of laws is designed to act as a lever to move behavior in desired directions. By gaining a better understanding of how and why our psychology motivates criminal behavior, we may be able to create more effective legal interventions to prevent crimes from occurring and more effective psychological treatments for offenders, likely offenders, and victims (see Buss & Duntley, 2003; Jones, 1997; Jones & Goldsmith, 2005;). Even if the application of evolutionary logic to help understand criminal behavior turns out to be misguided, the research findings it produces represent a valuable contribution to our understanding of crime.

In conclusion, evolutionary forensic psychology recognizes that crimes such as murder, assault, rape, and theft are manifestations of evolutionarily recurrent conflicts between individuals. The cost-inflicting strategies that we recognize as crimes may have been favored by natural selection when they gave individuals an advantage in competition for resources (see Buss & Duntley, 2006; Buss & Shackelford, 1997a; Daly & Wilson, 1988;). Darwin's theory of evolution by natural selection provides a powerful meta-theoretical framework that has the potential to unify and energize forensic psychology just as it has the biological sciences (see Buss, 2007; Cosmides & Tooby, 1992; Pinker, 1999; Tooby & Cosmides, 2005) and the field of psychology (Buss, 2007). We predict that evolutionary psychology will revolutionize forensic psychology, including our understanding of the psychology of crime, the cognition and behaviors of victims, jury selection, eye-witness testimony, judges' views of human nature, insanity, competency, and public policy. It is difficult to predict exactly how evolutionary psychology will impact the criminal justice system. The accumulation of research findings grounded in evolutionary theory will refine and change the way we think about legal systems. New discoveries will open new directions for inquiry and spawn additional research. Evolutionary forensic psychology represents the beginning of a revolution of thought and discovery that will bring us closer to the true nature of individuals, societies, morality, crime, and what our laws are capable of doing.

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Figure 1: Antagonistic coevolution of crime adaptations and adaptations to defend against victimization.

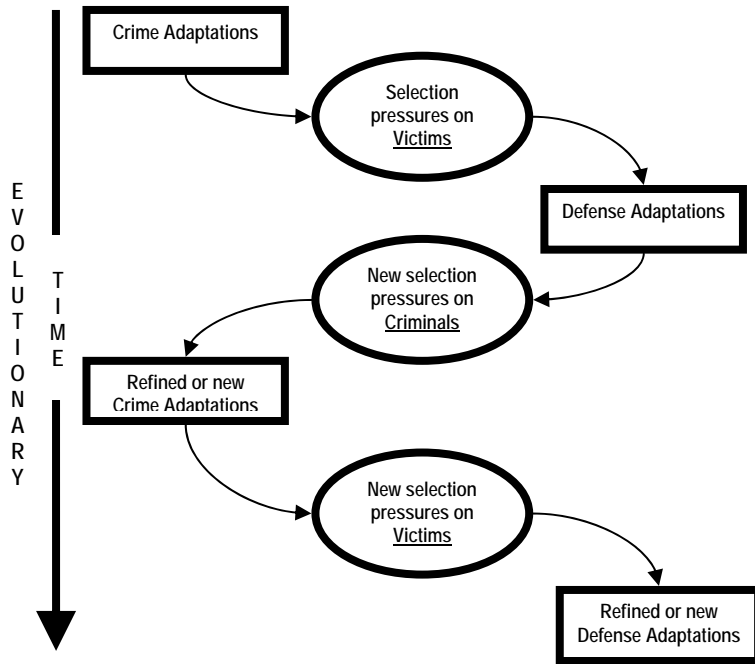


Figure 1: Adaptations that produce criminal behavior create selection pressure for the evolution of counter adaptations in victims, which in turn create novel selection pressures for the evolution of counter-counter adaptations in criminals.

Figure 2: Triadic antagonistic coevolution

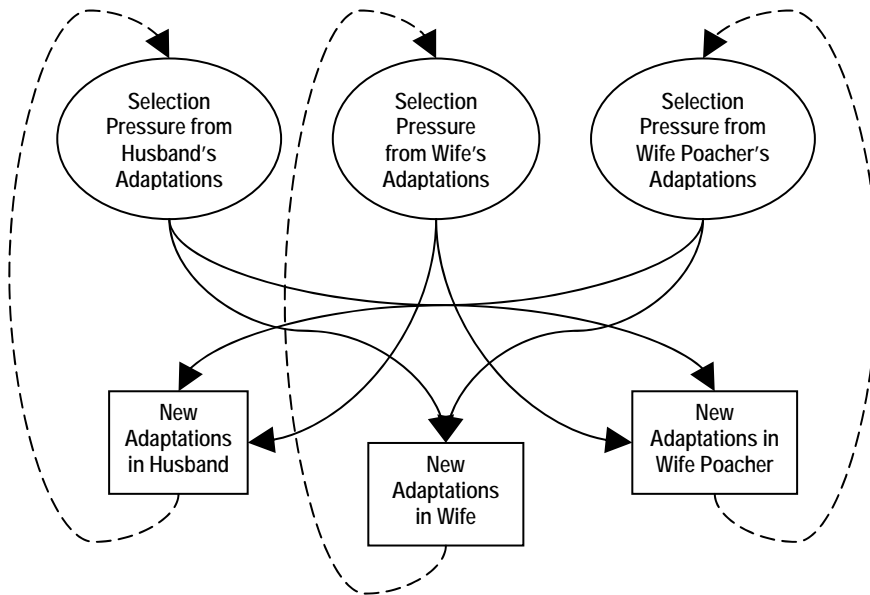


Figure 2: When three individuals have conflicting interests in the same adaptive problem domain, an adaptation in one individual can simultaneously create selection pressure on two (or more) other individuals. The counter adaptations that evolve in each of the two other individuals as a result can then create antagonistic selection pressure on the other two. This triadic coevolutionary process can carry on indefinitely through time, as long as there is recurrent conflict between those involved for some fitness relevant resource.

Figure 3: Cost-infliction as the solution to an adaptive problem can create secondary problems that require solution

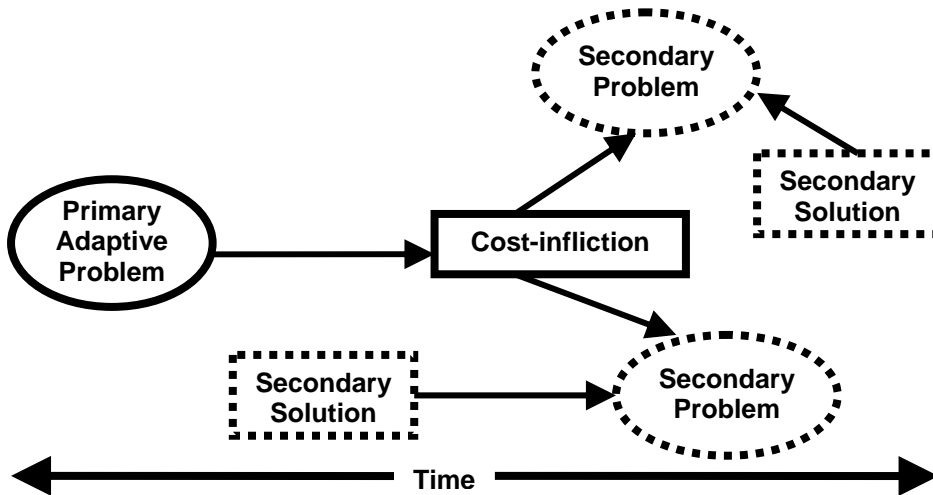


Figure 3: The use of cost-infliction to help solve an adaptive problem can create secondary problems, such as retribution from victims and their kin. Selection would have operated on the mind to anticipate likely problems resultant from cost-infliction and shaped a menu of possible solutions. Solutions to secondary problems created by criminal behavior could be enacted a before, during, or after the crime.