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HOMICIDAL IDEATIONS

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HOMICIDAL IDEATIONS

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HOMICIDAL IDEATIONS

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Tens of thousands of murders are committed worldwide each year, yet the psychology of homicide is not well understood. Although a number of theories have been proposed to explain homicide, none provide a complete or compelling account of existing patterns of murder and all are silent on the topic of the homicidal fantasies experienced by adults in the general population. A novel, adaptationist approach to homicide is employed in the current research to generate specific predictions about people's homicidal ideations. Murder is hypothesized to have contributed to the solution to recurrent problems faced by our ancestors, such as threats of physical harm, spousal infidelity, reputational damage, sexual victimization, and threats to the well-being of kin. Specific hypotheses about the nature and content of people's homicidal ideations are generated from this adaptationist explanation, including: (a) The majority of homicidal

fantasies will involve killing others who are not genetically related; (b) When men and women experience a homicidal fantasy as a result of their romantic partners' infidelity or cues to infidelity, they will be more likely to think of killing the intrasexual rival their partner is cheating with rather than their romantic partner; and (c) Men will be more likely than women to report experiencing a homicidal thought as a result of a romantic partner's infidelity. To test these and other hypotheses, participants from the Austin community completed a survey instrument that asked a series of questions about their most memorable fantasy of killing someone else. Seventy-six percent of women and 91 percent of men reported having at least one homicidal thought in their lifetime. The person both men and women most frequently thought of killing was an intrasexual rival. The majority of homicidal fantasies involved the murder of someone who was not a genetic relative. Men were significantly more likely than women to have a murder fantasy triggered by a romantic partner's infidelity. Women were more likely than men think of killing a rival who damaged their sexual reputation. These and other findings were predicted in advance by Homicide Adaptation Theory (Buss & Duntley, under review).

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Chapter 1 – Background

Incidence and Prevalence of Homicide

In the United States, you are ten times more likely to be murdered on the day you are born than any other time during your life (Centers for Disease Control, 2002). If you survive your first day, you still have a greater risk of being murdered during your first year of life than in any other year of childhood (Overpeck, Brenner, Trumble, Trifiletti, & Berendes, 1998).

Roughly 1 in 15,000 people is murdered in the United States each year (Stolinsky & Stolinsky, 2000). On first glance, this seems like a fairly rare event. But computed over a 75 year lifespan, this equates to a 1 in 133 chance of being murdered at some point during the individual lifetime of a white male, a 1 in 21 chance for a black male, a 1 in 369 chance for a white woman, and a 1 in 104 chance for a black woman (Ghiglieri, 1999). In 1999, homicide ranked 14th among the leading causes of death for men and women of all ages (CDC, 2002). But for men between the ages of 15 and 35, it was the second leading cause of death. For black men between 15 and 35 homicide was the leading cause of death.

Homicide rates vary predictably from culture to culture based on factors such as resource discrepancy and the relative costs and benefits of committing murder versus other strategies for solving problems, suggesting that humans may possess decision rules that guide the implementation of homicidal behaviors (Wilson & Daly, 1997). In the United States, the rates of killing are much higher than in many industrialized nations, exceeding those in the United Kingdom and Japan by a factor of 10; exceeding those in

France, Austria, Sweden, and Germany by a factor of 9; and exceeding the rates in Canada, Italy, Portugal, Korea, and Belgium by a factor of 5. But the homicide rates in many other countries are equivalent to or exceed those in the United States (United Nations, 1998). The lifetime probability of being murdered in Venezuela and Moldova is 1 in 90, twice that of the United States. In Estonia and Puerto Rico, the likelihood is 1 in 60, three times that of the United States. And in Colombia and South Africa, the likelihood is more than 1 in 20 that a person will die at the hands of a murderer, more than 10 times the lifetime homicide risk in the United States. Even among those nations that currently exhibit low homicide rates, a lack of murder is not a consistent part of their history. Historical evidence suggests that the relative absence of homicide in some countries is a recent societal invention (e.g. Ruff, 2001; Dower & George, 1995).

Within-culture rates of homicide typically do not include casualties of warfare or genocide. And the murder rates in many nations would undoubtedly be much higher were it not for emergency medical interventions that were not available to our ancestors for most of our evolutionary history. This is precisely the point made by the recent “Ambulance-Homicide Theory.” Researchers found that faster ambulances and better emergency room care were significantly responsible for the decrease in homicide rates over the last three decades in the United States. In fact, it has been estimated that there would be 30,000 to 50,000 additional murders in the U.S. each year – tripling, quadrupling, or more the current homicide rate – without the advances in emergency-care technology that have occurred during the last 30 years (Harris, Thomas, Fisher, & Hirsch, 2002).

The homicide rates in industrialized nations pale in comparison to the risk of being murdered in many primitive cultures. Homicides account for roughly 1 in 10 deaths of adult men among the Huli; 1 in 4 deaths among the Mae Enga; and 1 in 3 deaths among the Dugum Dani and Yanomamo (Chagnon, 1988). Even among the so-called “gentle people” or “peaceful” !Kung San of Botswana, there were 22 murders over a 25 year period among a population of 1,500, more than 4 times the rate of homicide in a typical year in the United States (Lee, 1984).

Homicidal Ideation

Unlike ideation related to homicide, suicidal ideation has received substantial research attention (Lester, 1997). Researchers have established a strong link between thoughts of committing suicide and suicidal behavior in adolescents (Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999; Gould, King, Greenwald, Fisher, Schwab-Stone, Kramer, Flisher, Goodman, Canino, & Shaffer, 1998), adults (Crosby, Cheltenham, & Sacks, 1999), and the elderly (Alexopoulos, Bruce, Hull, Sirey, & Kakuma, 1999). Surprisingly, very little research has been devoted to the topic of homicidal ideation outside of patients suffering from severe psychopathology (e.g. Schwartz, Petersen, & Skaggs, 2001). The report of homicidal ideations by patients suffering from schizophrenia is often considered a criterion for admission to psychiatric hospitals (Asnis, Kaplan, van Praag, & Sanderson, 1994). Interestingly, only 22 percent of schizophrenics in one study reported experiencing a homicidal thought in the past, significantly lower than the rate of murder fantasies reported in the general population (Kenrick & Sheets, 1993; Crabb, 2000).

Kenrick and Sheets (1993) conducted two studies of homicidal fantasies on a total of 760 undergraduate participants. They asked participants to provide demographic information, and then describe their *most recent* fantasies about killing someone else. They also asked for descriptions of the circumstances that triggered the fantasies and their content, such as how the participant thought of going through with the murder. Finally, they asked about the frequency of participants' homicidal fantasies and their relationship to the victim in their thought.

The studies yielded similar findings, so subsequent discussion will focus only on the second. The survey of homicidal fantasies found that more men (79 percent) than women (53 percent) reported having at least one homicidal fantasy in their lifetime. Men (38 percent) were also more likely than women (18 percent) to report having more than one homicidal fantasy in their lifetime. And men's homicidal fantasies tended to last longer than those experienced by women. Fifty-two percent of males reported that their fantasy of killing lasted longer than just "a few minutes" (i.e. "hours," "days," or longer). Only 37 percent of women indicated experiencing a murder fantasy that lasted as long.

The sexes also differed in the triggers of their murder fantasies. Men's thoughts of killing more often than women's were triggered by personal threats, theft of their belongings, a desire to know what it is like to kill, conflict over money, and public humiliation.

Crabb (2000) used a similar methodology to study homicidal fantasies and replicated many of the findings of Kenrick and Sheets (1993). Crabb also found that participants were more likely to fantasize about committing murder with weapons such as

guns and knives than with their bare hands. The majority of those participants indicated that they had access to the kind of weapon they fantasized about using.

Theories of Homicide

A number of theories of homicide have been proposed. Some have focused on identifying societal correlates of killing. Others have identified developmental, personality, or psychopathology predictors of who is most likely to commit murder. Still others have made arguments for the evolution of different lifetime strategies, some based on experiences early in development that predispose some people to be more likely to adopt criminal strategies, which may include murder. No theory provides a compelling explanation for what motivates the vast majority of murders. For our understanding of homicide to be complete, we must explain, for example, (1) why men are vastly over-represented among murderers (87%); (2) why men are also over-represented among murder victims (75%); (3) why women commit some kinds of homicide more than men (e.g., infanticide of own children); (4) why people kill in qualitatively distinct conditions, leading to predictable infanticides, step-child killings, men murdering women, women killing men, intrasexual rivalry homicides, and warfare killings; and (5) why people experience murder fantasies in circumstances that turn out to correspond closely to the contexts in which people actually commit murder (Buss & Duntley, under review). The research presented in this dissertation is based on a new theory of homicide that attempts to fill in many of the explanatory gaps left by previous explanations of murder.

Homicide Adaptation Theory

Buss and Duntley (under review) have proposed a new theory that humans possess adaptations for murder (Buss & Duntley, 1998, 1999, 2003, 2004, under review). According to their Homicide Adaptation Theory (HAT), murder is the designed output of evolved, psychological mechanisms. Psychological adaptations for homicide are argued to be the outcome of the process of natural selection. They were selected for when they contributed to better solutions to adaptive problems, on average, than competing designs. Information processing adaptations evolved to scrutinize and to sometimes produce homicidal behavior in adaptive problem contexts similar to those recurrently solvable by homicide in the past. Although some have suggested the possibility of adaptations for homicide (Ghiglieri, 1999; Pinker, 1997) and others have argued that humans may have an instinct to kill (e.g., Chagnon, 1988), no other theorists have gone into depth in exploring the likely design of adaptations for homicide (see a notable exception dealing with warfare: Tooby & Cosmides, 1988).

Buss and Duntley (under review) hypothesize that homicide was functional in solving a wide variety of adaptive problems. Specifically, the killing of a conspecific could have contributed to: (1) preventing the exploitation, injury, rape, or killing of self, kin, mates, and coalitional allies by conspecifics in the present and future; (2) reputation management against being perceived as easily exploited, injured, raped, or killed by conspecifics; (3) protecting resources, territory, shelter, and food from competitors; (4) eliminating resource-absorbing or costly individuals who are not genetically related (e.g., stepchildren); and (5) eliminating genetic relatives who interfere with investment in other

vehicles better able to translate resource investment into genetic fitness (e.g., deformed infants, the chronically ill or infirmed).

Homicide is such a unique and potentially powerful strategy that it was likely acted upon by heavy and diverse selection pressures. Homicide is different from other strategies for inflicting costs because it leads to the absolute end of direct competition between two individuals. The person who is killed can no longer compete with his killer. A murdered competitor can no longer directly influence the environment or social context that he shared with his murderer. The distinct outcomes of homicide would have created equally unique selection pressures to shape human psychology specifically for contexts of homicide (Buss & Duntley, under review; Duntley, 2005).

Adaptations for homicide would be more likely to evolve when they reliably contributed to the solution of an adaptive problem with a high impact on individual fitness, such as preventing a rival from killing one's child. Adaptations for homicide also would be more likely to evolve when a large number of different adaptive problems could be solved or at least partially solved by adopting a homicidal strategy. Consider, for example, the intrasexual rival of a man who was preventing his ascension in a status hierarchy, attempting to poach away the man's mate, monopolizing a scarce and valuable shelter as winter approaches, and who took every opportunity to publicly humiliate the man's brother. Murdering the rival has the potential to contribute to the solution of each of these adaptive problems. A large number of fitness costs are being inflicted by a single individual and a significant amount of benefits could be gained through his elimination. The greater the fitness costs that a rival imposes on an individual, and the

greater the benefits that would become available if the rival died, the heavier the weight of selection pressure for the evolution of homicidal strategies.

Different ancestral problems required different specific solutions. Homicide Adaptation Theory proposes that there are multiple, different psychological adaptations for homicide, each of which is devoted to the solution of different kinds of adaptive problems. Psychological design for infanticide is distinct from psychological design for warfare; psychological design for mate homicide in men is distinct from psychological design for mate killing in women. Some information processing mechanisms are undoubtedly shared between the different adaptations for homicide and with adaptations for the solution of other domains of adaptive problems. Selection would favor the sharing of subroutines performing the same function over reinventing them anew for each psychological adaptation. However, any given adaptation for homicide has at least one design feature that is distinct from other adaptations.

Homicide Adaptation Theory does not imply that homicide would have evolved to be the preferred strategy for each or any adaptive problem in all situations. In most sets of circumstances, the extremely high costs of committing murder would have outweighed its benefits. The theory does propose that homicidal behavior was the best solution for rare combinations of adaptive problems and circumstances, which provided selection pressure for the evolution of homicide adaptations. As a result, it is not possible to point to just one feature of a context that will activate a psychology of homicide in every instance, in every person. There are always other, mitigating environmental factors (Gartner, 1990), heritable personality features (Rhee & Waldman, 2002), biological

influences (Niehoff, 1999), and the developmental calibration of psychological mechanisms (Dodge, Bates, & Pettit, 1990) that influence behavior. Many or all of these features were part of the selection pressures that shaped homicide adaptations. Thus, a combination of cues to the presence of an adaptive problem ancestrally solvable by murder activates homicide adaptations. The presence or absence of these cues, as well as their magnitude, can help us to predict when conspecific killing will be more or less likely to occur. Without complete knowledge of how human psychology produces homicidal behavior, however, it is not possible to make perfect predictions about whether or not homicide will occur in any individual case. The same is true of making predictions about any behavior.

In sum, Homicide Adaptation Theory proposes a new explanation of homicide: Over the long expanse of human history, there were recurrent sources of conflict between individuals, such as conflict over reputation and social status, conflict over resources, and conflict over romantic partners. Killing is hypothesized to be one among an arsenal of strategies that was gradually shaped by natural selection to win conflicts with others. Homicide is unique from non-lethal solutions to conflict. Once dead, a person can no longer damage your reputation, steal your resources, prevent you from attracting a romantic partner, or sleep with your spouse. According to Homicide Adaptation theory, our evolutionary heritage has endowed all of us with a psychology for murder. These psychological processes lead us to entertain fantasies of killing and, in rare instances, act on them when we encounter sources of conflict that were successfully won by homicide in the evolutionary past.

Intentionality

As shorthand, the description of how psychological adaptations function to produce behavior is sometimes phrased as if the content of the processes is available to conscious awareness and under the intentional control of the individual. This may or may not be true. Evidence from studies of homicidal ideation suggests that some of the content of homicide mechanisms is available to conscious awareness. But conscious awareness of the cognitive processes that motivate homicidal behavior and a conscious intention to kill are not requisite features of adaptations for murder. There are many possible functions of making the content of information processing available to conscious awareness. First, it may have no function, a byproduct of memory systems or of metacognitive mechanisms (Wegner, 2002). Second, conscious awareness may be a true reflection of the most relevant or important information processing that is occurring at a given time, and may function to allow an individual to exert their will. Third, conscious awareness may function only to motivate behavior. According to this account, conscious awareness may or may not be a true reflection of the environment. Consistent with the logic of Error Management Theory (Haselton & Buss, 2000), consciousness may contain biases that lead to inaccuracies in the representation of information that function to motivate individuals to pursue adaptive strategies.

Homicide Adaptation Theory and other theories of murder

There are a variety of different explanations for homicide. Each has a unique perspective on killing and seeks to explain different aspects of the psychological and behavioral phenomena surrounding it. The purpose of Homicide Adaptation Theory is to explain the origins and functions of the psychological processes that produce reliable

patterns of homicidal fantasies and homicidal behavior. By itself, it may not always provide a complete explanation for why every individual commits murder. A number of other factors may lead to individual differences that influence the likelihood that a person will kill, including heritable individual differences in personality, exposure to violence during development, frontal lobe damage, personality disorders, and psychopathology. An evolutionary perspective on homicide is not at odds with any of these individual difference explanations. Homicide Adaptation Theory proposes the existence of organized, species-typical psychological processes responsible for producing homicidal behavior. Individual difference theories identify sources of variation between individuals that may affect an individual's threshold to commit violent acts, including murder. Importantly, because the outcomes of homicide and the kinds of information processing required to evaluate and generate homicidal behavior are so different from the cognitive processing associated with other forms of non-lethal criminality, it is likely not appropriate to generalize group differences in other forms of criminality to group differences in murder.

Adaptive individual difference theories

Individual difference factors may interact with evolved psychological mechanisms for homicide in at least two ways to produce a decreased threshold for committing murder (see Cosmides & Tooby, 1999 for a general discussion of this topic). First, the decreased threshold could be the designed product of evolved homicide adaptations. Even though killing is viewed as maladaptive in most cases in modern society, many murders could be the evolved output of psychological adaptations

functioning exactly as they were designed to function. Some evolutionary psychologists have argued that humans may have evolved two relatively inflexible alternative reproductive strategies. One involves a lifetime of cooperating with other individuals in order to successfully survive and reproduce; the other involves the systematic exploitation of others as a reproductive strategy. The two most prominent examples of such theories are Cheater Theory and r/K Theory.

Cheater Theory

Cheater theory is based on recognition that there is greater reproductive variance among men than among women (Mealey, 1995). Men are capable of producing more offspring than women in their lifetime. Men are also more likely to be locked out of mating because other men with higher status and more resources can monopolize numerous mates. It is access to women that is the primary factor limiting men's reproductive success. Although the maximum number of offspring women can produce in their lifetime is lower than the maximum number men can produce, it is less likely that women will be locked out of the mating market and unable to have children if they so desire. Because women's *minimum* investment in reproduction is greater than men's—9 months v. a few hours or minutes—the costs of a poor mate choice are greater for women than men, particularly in short-term mating contexts. Selection favored women who were more discriminating in their mate choice, although when men invest heavily in women and children, as occurs in long-term mating, men too are predicted to be quite discriminating (Buss, 1994). When faced with choosy females, males can respond in one of two ways: comply with women's desires for an investing partner or be deceptive about

their willingness and ability to invest. Both of these approaches are exhibited in other species as well (Alcock, 1993).

Proponents of cheater theory argue that two, alternative reproductive strategies have evolved in male humans. One type of male is law-abiding and loyal to women. Male cheaters, on the other hand, are argued to adopt strategies of criminality in contexts of social exchange to obtain resources and short-term mating strategies in romantic relationships. Building on the earlier proposals of Draper and Harpending (1982) and Kofoed (1988), Mealey (1995) and Lykken (1995) argued that cheater strategies evolved in humans in two forms: psychopaths and sociopaths. The distinction between the two is that psychopaths are genetically programmed to be cheaters while sociopaths learn a strategy of cheating and confine its use to their adolescence. As sociopaths mature, they are argued to be less likely to cheat (Mealey, 1995). Although no evidence collected to date directly supports Cheater Theory, it is consistent with sex differences in the rates of homicide and provides an explanation for why males are most likely to commit homicide in early adulthood (Daly & Wilson, 1988). Some murders may be accounted for as being part of a cheater strategy. Every known serial killer has been argued to suffer from anti-social personality disorder, psychopathy, an autistic spectrum disorder, or a combination of these (Wilson, 2003; Langevin, 2003; Silva, Ferrari, & Leong, 2003). Recent estimates indicate that homicides committed by sexual serial killers account for 0.5% of all murders committed annually (McNamara & Morton, 2004). Interestingly, psychopaths who kill do not always have a history of acting violently toward other people before they kill (e.g.

Scott Peterson) (Ellis & Walsh, 2000), though they do usually have a history of cruelty to animals (Mealey, 2000).

r/K Theory

Scientists have long recognized that organisms reproduce along a continuum (MacArthur & Wilson, 1967). The r-strategists at one end of the continuum, represent creatures that reproduce prolifically. The K-strategists at the other end are more limited in their reproductive capacity, having a maximum of two or three offspring in their lifetime. Humans are extreme K-strategists. Some researchers have proposed, however, that different individuals and different ethnic groups may fall at different points along the r – K continuum (Cunningham, 1981). According to r/K theory, those individuals who are the least extreme in their K strategy will have more children and be more prone to criminal and antisocial behavior (Ellis, 1989; Rushton, 1995). Proponents of r/K theory argue that criminal behavior is an r-approach to reproduction because it can result in rapidly acquiring resources that can be used to attract sex partners. There is evidence that violent acts, such as rape and murder, are often motivated by desires to acquire or maintain opportunities for mating (Daly & Wilson, 1988).

Alternative Adaptation Theory

David Rowe's alternative adaptation theory is consistent with the logic Cheater Theory and r/K theory, but also proposes an evolutionary mechanism by which two different morphs of males (cheaters and cooperators) could be maintained in the population. Alternative Adaptation Theory points out that criminals typically devote more effort to mating than they do to parenting (Rowe, Vazsonyi, & Figueredo, 1997; Rowe, Vazsonyi, & Flannery, 1995). It proposes that criminal behavior is the most direct

way of getting resources. For individuals to be successful criminals requires that they be willing to risk retaliation by victims. Rowe argues that criminality is a frequency-dependent strategy. A criminal strategy can only thrive when there are others to exploit. As the number of criminals in a population increases, the effectiveness of the criminal strategy will decrease.

Cheater Theory, r/K Theory, and Alternative Adaptation Theory introduce valuable evolutionary logic to help explain why people engage in different types of criminal behavior, including homicide. These explanations may be able to account for some of the variance in why people commit homicide. They cannot, however, explain all murders. Certain patterns of homicide, such as those committed by women and males with no evidence of psychopathy or sociopathy are difficult to explain with these theories. The theories also do not comment on the specific design features of psychological adaptations for criminality generally or homicide specifically, which are capable of generating fantasies of killing in the majority of people. They do not explain why people would adopt a behavioral strategy involving murder instead of doing something else to obtain resources, mates, or resolve social conflict.

Cultural and Social Theories of Homicide

Evolved mechanisms for homicide need not be as inflexible as those proposed by Cheater Theory and r/K Theory. Because ancestral environments were likely recurrently variable in a limited number of reproductively relevant ways (Tooby & Cosmides, 1990), learning adaptations likely evolved to be sensitive to relevant patterns of variability in the environment that provided information about the adaptiveness of employing homicide as

the solution to specific problems. Growing up in a country ravaged by war, for example, may have the effect of leading an individual to be more likely to kill in response to social conflicts with others than a person whose childhood development occurred in a more peaceful environment, such as the wealthy suburbs of a city in the United States. Homicide Adaptation Theory proposes that mechanisms that produce murder should be sensitive to the costs and benefits of killing in the local environment, and use that information to calibrate the likelihood of adopting a homicidal strategy. A decreased threshold for committing murder, in this example, is the designed, adaptive product of adaptations for homicide.

Implicit in this account of murder mechanisms is the existence of learning algorithms sensitive to specific environmental inputs that function to adjust or calibrate the action of homicide adaptations. It is beyond the scope of this dissertation to discuss the nature of evolved learning mechanisms. However, such mechanisms, from an adaptationist perspective, should have evolved to be as domain-specific as the other design features of adaptations for homicide proposed in this manuscript and elsewhere (see Buss & Duntley, under review; Duntley, 2005; Duntley & Buss, 2005). A number of cultural and social theories of murder have been proposed to explain how specific environmental influences might lead to murder.

Cultural Theories

Many explanations for homicide have focused on the role of cultural norms (Gelles & Strauss, 1979; Goldstein, 1986; Rummel, 1991). According to these theories, homicide is the result of exposure to cultural influences that may promote violence,

which are inculcated into the human psyche. According to the cultural theories, those individuals exposed to cultural influences that promote homicide should be more likely to commit murder than those who are not exposed to such influences. Two similar examples of cultural theories invoked to explain homicide are the “subcultures of violence” (Wolfgang & Ferracuti, 1967) and “culture of honor” (Nisbett, 1993) theories. Designed to explain why homicide rates vary from culture to culture, these theories propose that, at least within the United States, some subcultures exist that encourage the use of violence in settling interpersonal disputes.

These theories may help to explain some of the cultural variability in homicide rates. For example, there is some evidence that murder is more common in the cultures of honor in the southern United States than in cultures that valorize violence less in the northern United States (Cohen, 1998). However, a relatively limited number of hypotheses have been derived from these theories and only a minority have been confirmed (Hagan, Simpson, & Gillis, 1987; Simpson, 1991; Avakame, 1997). In addition, Daly and Wilson (1989) have pointed out that many cultural theories are not complete because they merely describe the cultural differences they are supposed to explain. Similar arguments criticizing the circular reasoning of these theories have been made by others (e.g. Hagan, Gillis, & Simpson, 1985).

Social Theories

One of the earliest social theories of crime was proposed by Edwin Sutherland (Sutherland & Cressey, 1974). According to differential association theory, criminal behavior, including homicide, is just another kind of behavior that is learned from people

with whom an individual interacts. Sutherland also argued that everyone has an equal potential to learn to be a criminal.

Social learning theory was first proposed as a general explanation of human behavior (Bandura, 1973) and only subsequently adapted to explain some aspects of homicide (Berkowitz, 1993). Gerald Patterson (1982), in another version of social learning theory, argues that parents, teachers, and peers sometimes unintentionally reinforce what starts out to be occasional and rather trivial antisocial behavior in children, but then escalates into serious offending behavior in adolescence. Patterson's version focuses primarily on experiences in the early years of development and little on experiences during adolescence as causes of criminality. Social role theory (Eagly, 1995) and socialization theory (Berkowitz, 1993) share many of the same assumptions as social learning theory. Each of these theories proposes that behaviors originate in the process of observing and imitating others. Some behaviors are rewarded and others are punished, gradually shaping an individual's range of behaviors. These social theories have been used to explain sex differences in homicide rates and the imitation of violent behavior (Daly & Wilson, 1989).

A core assumption of social theories that leads them to predict that men should be more likely to commit homicide than women is that observing violence in the world causes violent behavior. Because humans observe more instances of men perpetrating violent acts in life and in the media, the theories propose, men are more likely than women to engage in similar behaviors. The causal arrow linking violence in the world to the violent behavior of individuals, however, need not run in this direction. For example,

evidence shows that boys preferentially seek out violent toys and media images (Hoyenga & Hoyenga, 1993). When parents encourage their boys to be tough and their girls to be gentle, they may be responding to existing predispositions in each sex. Popular media may target boys with more violent programming than girls to exploit desires each sex already has.

The imitation of violence in the media is also limited in its explanatory power as a causative influence of homicide because it cannot explain evidence of killing in the distant past. The earliest evidence for outright murder comes from a site in Shanidar, in Iraqi Kurdistan (Tattersall, 1999). This site, located in the Zagros Mountains near the Turkish border, was excavated in the 1950s by the archaeologist Ralph Solecki, and dates to about 60 to 100 thousand years ago. The human remains at this site include nine different Neanderthal individuals. Their skeletons show varying degrees of trauma, but one stands out. Shanidar 3 is a fragmentary skeleton which includes a partially healed injury on the top of the left, ninth rib. The injury consists of a parallel-sided groove. Pathologists who have seen it agree that it was caused by a penetrating wound, about what one would expect if a right-handed individual stabbed Shanidar 3 while they were standing face-to-face (Trinkhaus, 1993).

In sum, cultural and social theories of homicide propose that the process of learning from the social environment is responsible for differences in homicide rates between cultures and differences in men's and women's propensity to kill. Cultures of honor valorize violence as a solution to interpersonal disputes, and violence is socially encouraged in male children but discouraged in female children. Learning is

undoubtedly important for the adaptive calibration and activation of adaptations for homicide and the pursuit of homicidal strategies, accounting for some of the variance in why people kill. However, cultural and learning theories in their present form are too general to generate specific hypotheses of how experience affects psychological processes involved in producing homicide differently from psychological processes involved in addressing other domains of human experience, such as mating relationships and food preferences. The addition of an evolutionary perspective to the study of how social and cultural processes affect individuals' psychology of homicide has great potential to suggest fruitful directions for future research, and may help to account for many observed patterns of homicide (e.g. infanticide perpetrated primarily by young mothers) (Gove, 1985). This would allow novel, specific predictions to be generated about trends in homicide that may be the function of different social environments, and help to explain why people sometimes commit homicide instead of doing something else.

Conditional Adaptation Theory

An evolutionary theory that has taken initial steps toward integrating social and cultural theories with an evolutionary perspective of criminality is Conditional Adaptation Theory. It is both an adaptive individual difference theory and a learning theory. Consistent with the logic that adaptations for homicide require observation and interaction with the environment, Conditional Adaptation Theory proposes that everyone has the same genetic potential to exhibit criminal behavior at birth. Depending on early life experiences, individuals' potentials change. Unstable, resource scarce environments are proposed to be a signal that current living conditions are harsh and competition

between individuals for resources is high. Children who witness poor, unstable relationships between their genetic parents and live in relatively resource-scarce environments are argued to be more likely to adopt short-term, opportunistic mating strategies as adults. They are also argued to adopt riskier strategies for obtaining resources, including theft and violence. According to conditional adaptation theory, these strategies are better adapted to such environments than strategies involving long-term mating and cooperation (Belsky, 1997).

Although Conditional Adaptation Theory moves closer to integrating cultural and social learning perspectives with an evolutionary perspective and may account for some of the variance in patterns of homicide, to date, no data has been collected on its ability to predict group differences in murder or fantasies of killing. Because the outcomes of homicide and the kinds of information processing required to evaluate and generate homicidal behavior are so different from the cognitive processing associated with other forms of criminality, it is likely not appropriate to generalize group differences in other forms of criminality to group differences in murder. Additionally, Conditional Adaptation Theory, by itself, does not specify whether and under what conditions people whose development is canalized in a long-term direction might adopt criminal strategies. It also does not specify the nature of design features of psychological adaptations for criminality, nor discuss homicide specifically. Finally, the theory does not address the role of other sources of individual differences, such as personality differences or those rooted in psychopathology.

Individual differences as sources of error leading to homicide

A second way that individual difference factors may interact with evolved psychological mechanisms for homicide to produce a decreased threshold for committing murder (see Cosmides & Tooby, 1999 for a general discussion of this topic) is by leading to the inappropriate activation of adaptations for homicide. The mistaken activation of adaptations that produce murder may have several sources, including: (a) the presence of evolutionarily novel stimuli in modern environments that “trick” homicide adaptations into recognizing a problem as potentially solvable by killing when it is not; (b) errors in the mechanisms that weigh the costs and benefits of homicide, leading to the underestimation of costs, the overestimation of benefits, or both, and (c) a failure of some mechanisms that are necessary for the normal functioning of homicide adaptations to activate, leading to incomplete processing and the erroneous motivation of homicidal behaviors. In each of these cases, the majority of evolved mechanisms for homicide continue to function as they were designed. Thus, despite systematic errors at some level of cognitive processing, a complete explanation of murder that is partially the result of inappropriate activation of homicide mechanisms must include an analysis of the evolved mechanisms involved. A number of different forms of psychopathology have been implicated in contributing to an increased likelihood of murder.

Pathology Theories

Suboptimal Arousal Theory

In the 1950s and 60s, researchers began to document that some people are less sensitive to environmental stimuli than others. This led to the proposal of suboptimal arousal theory to explain criminality, including homicide (Lykken, 1982; Eysenck, 1977).

This theory is based on the observation that some people prefer intense environmental stimulation and others do not. If a person's arousal control center is unusually sensitive to incoming stimuli, he or she will be prone to quickly learn to avoid engaging in behavior that raises the intensity of stimuli to unpleasant levels. Individuals who have a reticular formation that is unusually insensitive to environmental stimuli, however, will require a high level of unpleasant stimuli before learning to avoid the behavior that provokes it. The latter individuals will be unusually prone to commit criminal and antisocial behavior. Suboptimal arousal theory proposes that a substantial amount of behavior is directed toward maintaining an optimal level of arousal. Those who feel most starved for arousal are those most likely to be criminals.

Suboptimal arousal theory is consistent with research finding that criminals and psychopaths exhibit greater than normal pain tolerance (Fowles, 1993), that criminal behavior is linked to symptoms of ADHD (Satterfield, 1987), and that low serotonin levels are linked to ADHD (Brase & Loh, 1975), conduct disorders (Pliszka & Rogeness, Renner, Sherman, & Broussard, 1988), and aggressive-impulsive behavior (Coccaro, Siever, Klar, Maurer, Cochrane, Cooper, Mohs, & Davis, 1989).

Seizuring Theory

Beginning in the 1970s, a group of psychiatrists and neuroscientists started to consider the role of the limbic system in certain criminal behaviors (Monroe, Hulfish, Balis, Lion, Rubin, McDonald, Barcik, 1977). They began this line of investigation to try to explain the origins of "senseless" violent acts, such as violence resulting from trivial arguments and gunning down co-workers. Seizuring theory was based on research into

the causes of epilepsy. Not all seizures lead to convulsions. Confined to only certain areas of the brain, these subconvulsive seizures, if located in the limbic system, may not affect movement or motor coordination, but may have significant effects on emotions. These seizures may sometimes result in criminal behavior, motivating behavior driven by powerful emotions without input from higher brain centers (Mungas, 1983). The amygdala is the area of the limbic system most often implicated by seizing theory as involved in the production of violence (Smith, 1980). Amygdala damage has been shown to release violent behavior in humans (Elliott, 1976) and other animals (Albert, 1992).

One source of support for seizing theory comes from evidence suggesting that seizures are most highly associated with unusually impulsive and irrational offenses. Several studies have found impulsive violence to be more common for people with a history of subconvulsive seizures. Similar results have been found in animal research (Albert, 1993). Traumatic brain injuries are one of the main causes of brain seizures (Ribak, Harris, Vaughn, & Roberts, 1979). Several studies have found higher rates of brain injury in violent offenders than in the general population (Lewis, Pincus, Lovely, Spitzer, & Moy, 1987).

Frontal Lobe Theory

A number of hypotheses have been proposed about the involvement of the frontal lobes in violence (Lueger & Gill, 1990). The basic conclusion of frontal lobe theorists is that failure of the frontal lobes to function properly may disinhibit violent behavior. The frontal lobes are argued to help guide behavior that requires long-term planning and foresight in a complex social environment. Failures in executive functioning in the

frontal lobes, according to this theory, lead people to be less aware of the long-term consequences of violence and more likely to solve problems of social conflict in criminal ways. Consistent with frontal lobe theory, there is good evidence linking frontal lobe dysfunction with ADHD (Barkley, 1997). Additionally, people with severe frontal lobe damage have been found to exhibit increased violent behavior (Damasio, Grabowski, Frank, Galabrunda, & Damasio, 1994), accompanied by difficulty planning for the future (Pennington & Ozonoff, 1996). This lack of normal functioning has been implicated in an increase of an impulsive sub-type of aggressive behavior (Brower & Price, 2001), and may be a factor in some homicides. The increased impulsivity and lack of planning ability associated with frontal lobe damage, however, suggests that different or additional psychological processes may be important in premeditated murders and the production of homicidal ideations. Most people who suffer from psychopathology do not commit violence of any sort (Taylor & Gunn, 1999).

Genetic Abnormality Theory

Another theory of pathology invokes genetic abnormalities. For reasons that are not well understood, one male out of every 700 to 1,000 is born with an extra Y-chromosome (XYY rather than the normal XY), and one male out of every 500 is born with an extra X-chromosome (XXY) (Hoffman, 1977). Both genetic abnormalities result in males who are above average in height (Horgan, 1993), develop more acne problems during adolescence (Witkin, Mednick, Schulsinger, Bakkestrom, Christiansen, Goodenough, Hirschhorn, Lundsteen, Owen, Phillip, Rubin, & Stocking, 1976), and score lower on standard intelligence tests (Horgan, 1993). Persons with these forms of

genetic abnormality show an increased likelihood of criminal behavior, with prison populations showing five-times the proportion of these individuals compared with the general male population. However, studies have failed to find any excess of *violent* offenses among them (Witkin, et. al, 1976). The only possible exception is from studies indicating that sex offenses appear to be higher among XYY and XXY male offenders than among XY male offenders (Reiss & Roth, 1993). These genetic abnormalities are likely to explain only a tiny fraction of the homicides committed, since males with an extra chromosome only constitute 1 - 2% of the prison population (Witkin, et. al, 1976).

Other Psychopathology Theories

Psychopathology is a factor in many murders. Molecular genetic studies have begun to identify the specific genes that may have some involvement in producing murder. In one study of schizophrenics, a genetic polymorphism that led to low catechol o-methyltransferase activity occurred more frequently among violent than nonviolent schizophrenic patients and also occurred more frequently among homicidal than nonviolent patients (Kotler, Barak, Cohen, Averbuch, Grinshpoon, Gritsenko, Nemanov, & Ebstein, 1999).

A prospective study of major mental disorders and criminality conducted using a birth cohort in Northern Finland found that violent offenses were most prevalent among males with alcohol-induced psychoses or schizophrenic alcohol users. Those suffering from depression were least likely to kill (Tiihonen, Isohanni, Rasanen, Koiranen, & Moring, 1997). Research conducted in Australia (Mouzos, 1999) and Sweden (Fazel & Grann, 2004) found a similar trend in the disorders that are most common among killers,

which also include bipolar disorder, psychopathy, dissociative identity disorder, and unipolar mania. In both studies, people with mental illness were found to be more likely to kill members of their families than people not suffering from a disorder. Proximity Theory (Hindelang, Gottfredson, & Garofalo, 1978; Hindelang, 1976), long dismissed by homicide researchers as an explanation for homicide (Daly & Wilson, 1988), may be somewhat compatible with the trends in homicide apparent among the mentally ill.

Interestingly, the percentage of homicides that can be attributed to psychopathology appears to be linked to the homicide rate. Where homicide is rare, a higher proportion of murders are committed by people suffering from disorders like schizophrenia or other psychoses. Where homicide is more frequent, a smaller percentage of killers are identified as suffering from major psychopathology. For example, studies of the perpetrators of homicide in Britain found that 39 percent of killers suffered from a mental disorder (Gibson, 1975). In Sweden, 53 percent of murderers were found to be mentally ill (Lindqvist, 1986) as were 35 percent of Canadian killers (Cote & Hodgins, 1992). Britain, Sweden, and Canada have among the lowest homicide rates in the world (Ghiglieri, 1999). In contrast, only 19 percent of murderers in New York (Grumberg, Klinger, & Grumet, 1977), 4.4 percent of killers in Detroit (Boudouris, 1974), and 4.4 percent of homicidal offenders in Australia (Wallace, Mullen, Burgess, Palmer, Ruschena, & Browne, 1998) were found to suffer from mental illness.

These differences may provide insight into the evolved functioning of adaptations for murder. In both the United States and Australia, there may be environmental cues that are more likely to activate psychological adaptations for homicide as the solution to

adaptive problems faced by individuals. The global criminological literature is not in a state for precise comparisons of the circumstances that may lead cultural differences in the cost-benefit calculus of whether an individual should murder (Ellis & Walsh, 2000). However, some factors are possible candidates. The amount of discrepancy in resources between the rich and poor may be important (Wilson & Daly, 1997). A greater resource discrepancy may lead to greater average pay-offs for adopting risky strategies. Cross-cultural differences in the reputational damage suffered as a result of murdering vs. the reputational benefit from being known as a killer may also be important. The reputations of gang members in Los Angeles and New York have been shown to benefit after murdering a member of a rival gang (Vigil, 2003; Alvarez & Bachman, 2002). Higher status gang members have been shown to have more mating partners (Ghiglieri, 1999). The reputational effects of committing murder are similar among the Yanomamo of Venezuela (Chagnon, 1988).

The likelihood of being punished and the severity of punishment for certain types of homicide are also likely to be important. Infanticides are more common in China, India, Indonesia, and the Sudan than they are in the United States, Britain, or Canada where such killing is more routinely and more severely punished. Similarly, the murder by men of their female romantic partners is more common in Brazil, Russia, the Ukraine, and in the Middle East than it is in Western European countries, the United States, and Canada. The latter countries have more routine and costly penalties for such killings (United Nations, 1998).

In sum, there is evidence that psychopathology is a contributing factor in some homicides, and that these murders are more likely to contain manifestations of mental disease, such as the murder of genetic relatives. This does not mean, however, that psychopathology is the sole cause of such homicides. Psychopathology and likely most personality differences do not add additional information processing capabilities to the adaptations that produce homicide. These sources of individual differences more likely distort cognitive adaptations, sometimes affecting the likelihood that a person will kill. An individual with schizophrenia who has delusions that his mother is an extraterrestrial who has plans to eliminate all of humanity, for example, obviously has errors in the interpretation of information from the environment. Despite these errors in interpreting input, the activation of psychological mechanisms to produce homicide may be appropriate and adaptive if it was the case that his mother was an extraterrestrial. It is difficult to kill someone. The production of a sequence of behaviors capable of successfully ending another person's life requires a large number of calculations that cognitive system errors, by themselves, would be incapable of producing. One reasonable hypothesis is that psychopathology leads to the inappropriate activation of patterned mechanisms capable of producing successful homicidal behavior. A challenge for the future of research is the identification of how, specifically, different forms of psychopathology interact with the psychological processes that produce homicide to lead to the inappropriate motivation of murder.

Personality Theories

Individual differences in personality also contribute to the likelihood that an individual will commit murder, particularly certain extreme personality types such as those manifested in personality disorders like anti-social personality disorder. People who score high on measures of anti-social personality, low in conscientiousness, high in neuroticism, and score low on I.Q. tests have been shown to be more likely to engage in criminal activities (Steadman, Silver, Appelbaum, Robbins, Mulvey, Roth, Grisso, Banks, & Monahan, 2001; DeFries, McGuffin, McClearn, & Plomin, 2000; Hodgins, 1992). Childhood experiences, violent thoughts, and anger have also been implicated (Steadman, et. al, 2001).

Differences in personality, however, do not constitute a complete explanation of why people kill. Specific personality differences interact with mechanisms responsible for the production of homicidal behavior, leading to individual differences in thresholds to commit murder. Just as some personality characteristics are associated with an increased likelihood that a person will commit homicide, others are associated with a decreased risk. From an evolutionary perspective, it is unclear whether one or the other extreme is more functional. In environments where competition between conspecifics is hostile, a hair-trigger for homicide could provide an adaptive advantage. In other environments where resources are relatively plentiful and interpersonal conflict is low, those with a higher homicide threshold may have an adaptive advantage. Recurrent variation in competition for reproductively relevant resources in ancestral environments could maintain heritable individual differences in personality that affect homicide thresholds.

Heritable individual differences in personality may also lead to the differential activation of psychological adaptations for homicide in other ways. Personality leads people to experience the same environments differently, seek out different environments, and be excluded from a certain subset of social environments. For example, some heritable personality traits, such as lower intelligence or higher neuroticism, may lead people to occupy social environments where there is greater competition for scarce resources and competitors are more likely to be emotionally unstable. People in such environments would be more likely to encounter cues that activate murder adaptations.

Homicide as a byproduct of other adaptations

Adaptations for homicide need not be involved in the production of all homicidal behavior. Another evolutionary explanation of killing was proposed first by Daly and Wilson in their book *Homicide* (1988). According to Daly and Wilson, homicide may be considered an over-reactive mistake, the byproduct of psychological adaptations designed for non-lethal outcomes. They argue that homicide should only be used “as a sort of ‘assay’ of the evolved psychology of interpersonal conflict does not presuppose that killing per se is or ever was adaptive” (Wilson, Daly, & Daniele, 1989, p. 12). For example, the behavior of a teenage mother who abandons her newborn in a dumpster to die may be explained by the failure of her psychological mechanisms for parenting to engage. Similarly, in the case of a husband who kills his wife for being sexually unfaithful, Daly and Wilson have argued that male mechanisms for sexual jealousy and the coercion and control of their mates may mistakenly overreact, leading the man to kill his wife. Despite their contention that murder is a maladaptive byproduct of

psychological adaptations, Daly & Wilson (1989) do emphasize that an evolutionary account of homicidal behavior is extremely important: “. . . what is needed is a Darwinian psychology that uses evolutionary ideas as a metatheory for the postulation of cognitive/emotional/motivational mechanisms and strategies” (p. 108-109).

There are reasons to question whether their theory is an adequate explanation of all murderous behaviors. First, if homicide has never been adaptive as Daly and Wilson claim, then selection could not have fashioned adaptations for homicide. The only remaining possibilities are that homicide was neutral in terms of selection or that it had negative selective consequences. In contexts where homicide yielded recurrently negative fitness consequences, there would have been active selection pressure against killing others. Yet currently, murders continue to take place. In some cultures, the lifetime risk of being murdered is as high as 1 in 3 for men (Ghiglieri, 1999). Daly and Wilson do not explain how a behavior with negative selective consequences could be maintained over our evolutionary history. But there are at least two possible explanations. First, the overall benefits of psychological adaptations that sometimes produce homicide as a byproduct may have outweighed the occasional costs associated with killing a conspecific over our evolutionary history. Another, related possibility is that selection has operated to eliminate byproduct murders in contexts where such killing was too costly, modifying or fashioning new psychological mechanisms for this purpose. This explanation, however, is no longer a strict byproduct hypothesis of the origins of homicide. It suggests that selection has acted to inhibit homicide in some contexts, while allowing it to persist in others. Instead of an argument against adaptations for homicide,

this seems a plausible explanation for the origins of homicide adaptations—through the gradual selection of the rare subset of situations in which homicides lead to greater benefits than costs.

Second, the byproduct theory of homicide fails to identify the specific overreactive cognitive mistakes that lead people to kill. In fact, the byproduct theory does not explore how information is processed in any of the adaptations shaped for their nonlethal consequences that sometimes lead people to kill. Without understanding their normal function, it is impossible to determine how these mechanisms may malfunction to produce homicide. Third, the byproduct theory of homicide has difficulty explaining the double standard it applies to conspecific killing in other species and homicide in humans. Humans are not the only species that kill their own kind.

Numerous species kill conspecifics in predictable contexts. Among insects (including mantids, black widow spiders, jumping spiders, and scorpions), females commonly murder their male mates when subsequent consumption of the male leads to a greater number and increased viability of offspring. The males of these species do not sacrifice themselves willingly. In the sexually cannibalistic black widow spider *Latrodectus mactans*, for example, males that escape their cannibalistic mates can often fertilize multiple partners (Breene & Sweet, 1985). Males across sexually cannibalistic species use a diverse array of strategies to decrease their chances of being eaten by their mates: Male scorpions sometimes sting their mates after depositing their spermatophore (Polis & Farley, 1979); male crab spiders (Bristowe, 1958) and black widows (Gould, 1984) sometimes wrap up females in silk before mating with them.

Among mammals there are many well-documented patterns of conspecific killing. Male lions, wolves, hyenas, cougars, and cheetahs have been observed to kill the offspring of rival males (Ghiglieri, 1999). Killer lions often benefit because the mothers of the infants that are killed often go into estrus sooner, allowing the infanticidal males to impregnate them with offspring of their own sooner. Among primate species, conspecific infanticides have been documented in similar contexts among a number of species, including langur monkeys (Hrdy, 1977), red howler monkeys (Crockett & Sekulic, 1984), mountain gorillas (Fossey, 1984), chimpanzees (Bygott, 1972), and others (Hausfater & Hrdy, 1984). The killing of rival, adult males has also been well documented among mountain gorillas (Fossey, 1984) and the chimpanzees of Gombe (Wrangham & Peterson, 1996), two of our closest genetic relatives. Without marshalling any empirical evidence in support of its contention, the byproduct theory of homicide argues that humans are different from all other animal species.

Finally, the byproduct theory of homicide has difficulty accounting for premeditated murders, killings perpetrated by people who planned out their deadly act for weeks, months, or even years. Premeditated murders are likely only the tip of the iceberg of cognitive effort devoted to homicide. The majority of male and female undergraduates report having at least one homicidal fantasy in their lifetime (Kenrick & Sheets, 1993). The byproduct theory of homicide has no explanation for the existence of homicidal ideation; no explanation for why people devote a significant amount of time and cognitive energy to building scenarios about ending the life of another individual. The byproduct theory also does not specify whether homicidal ideations are also byproducts

of mechanisms selected for their nonlethal consequences or if they may be adaptive. Advocates of the byproduct theory do not address the topic of homicidal ideations at all.

From the adaptationist perspective of Homicide Adaptation Theory, the contexts that produce homicide as a byproduct are unlikely to be contexts for which homicide evolved to be a possible solution. True byproduct homicides, in other words, should not be associated with circumstances that could be adaptively addressed with murder. For example, a single woman at a wedding who dies as a result of being pushed against a wall by other women seeking to obtain the bouquet tossed by the bride has not died as a result of adaptations for murder. Her death was more likely the result of adaptations for social competition selected for their nonlethal outcomes. If the murder of an individual could have lead to a net benefit, on average, over our evolutionary history, that killing could plausibly be the functional output of adaptations for homicide. Homicide Adaptation Theory proposes that the majority of murders are the functional outputs of adaptations to kill (Buss & Duntley, under review).

By this logic, there are no random homicides. Even those murders that are influenced by severe psychological disorders may have random or inappropriate targets, but random cognitive processes are unlikely to be able to produce the highly patterned sequences of behaviors capable of killing someone. Even homicides that may be true byproducts of adaptations designed for their nonlethal outcomes are likely not to be patterned randomly, but instead highly correlated with specific categories of interpersonal conflict over reproductively relevant resources.

In sum, nonadaptationist explanations of homicide may be able to predict some variance in who is likely to become a criminal, and identify some broad features of contexts that may trigger criminal behavior. When considered individually, they all share similar weaknesses, which include: (1) a failure to provide a comprehensive explanation of the patterns of homicide, (2) not making predictions about when homicide, instead of some other criminal behavior, is likely to occur, (3) not offering explanations for a large number of the observed patterns of homicide, (4) not specifying whether homicide is a kind of criminal behavior that could have ever been adaptive during our evolutionary history, (5) failure to provide an explanation for why people who are not pursuing a general strategy of criminality would ever commit homicide, (6) an inability to explain why the majority of normal people report experiencing homicidal fantasies, and (7) failure to explain the patterns of people's homicidal fantasies.

Different theories of homicide need not be competing. They are often complementary, capable of accounting for unique variance in why a person commits murder in any individual case. When there is competition between different explanations of homicide, it is most often between different theories at the same level of explanation. Buss and Duntley (under review) and Daly and Wilson (1988), for example, have proposed competing theories at the ultimate level of explanation, which focuses on the evolutionary origins, design, and functions of psychological mechanisms involved in producing murder. Buss and Duntley (under review) argue that most homicides are the result of adaptations that evolved specifically to produce murderous behavior, which runs counter to Daly & Wilson's (1988) proposal that homicide is the unintentional,

maladaptive byproduct of psychological mechanisms selected for their non-lethal consequences.

The theories of homicide discussed in this chapter can be thought of as addressing two different levels of explanation: a proximate level and an ultimate level. The proximate explanations focus primarily on environmental influences on homicidal behavior and correlates of murder. They identify important factors that interact with the psychological processes that produce homicidal behavior, increasing or decreasing its likelihood. These factors include social and cultural influences, psychopathology, and personality differences.

The ultimate level theories of homicide explain the origins, function, and design of cognitive adaptations that generate behaviors capable of murdering someone else. They include r/K theory, alternative adaptation theory, conditional adaptation theory, cheater theory, byproduct theory, and Homicide Adaptation Theory. These theories identify characteristics of ancestral environments that may have selected for specific psychological design to produce homicide in certain contexts.

Chapter 2 – Homicidal Ideation

According to Homicide Adaptation Theory (HAT), homicidal ideation is a functional component of adaptive design for murder (Buss & Duntley, under review) and as a consequence provides a window into the psychological processes that produce homicide. That is, HAT is not JUST using homicidal fantasies as a window into the psychology of homicide similar to the way Daly & Wilson (1988) use homicide as an assay of conflict. HAT proposes that ideations of killing also have evolved functions.

Other hypothesized design features of adaptations for homicide include mechanisms that estimate the magnitude of different kinds of force required to kill, the creation of emotional states (e.g. homicidal rage, lack of empathy) to facilitate killing, and the implementation of strategies to minimize the costs of homicide preemptively (e.g. impugning the reputation of intended victims, driving a wedge in the relationships between intended victims and their kin and social allies, systematically creating an opportunity to kill that minimizes costs) and after the murder has occurred (e.g. villainizing victims as instigating the violence that led to their death, concealing evidence of foul play, killing others who might seek revenge for the victim's death). Homicidal fantasies simultaneously provide a window in the psychological design for murder and are functional components of the psychology of conspecific killing.

It is unlikely that natural selection fashioned special adaptations for thoughts of murder *de novo*. It is more plausible that existing psychological design capable of producing ideation was coopted for the purpose of considering homicide. A primary difference between fantasies of homicide and fantasies of nonlethal violence are the

unique values of costs and benefits of each category of behavior. As discussed previously, the elimination of another individual has unique benefits and costs that differ in magnitude from nonlethal forms of violence. As a result, mechanisms that were tapped to generate uniquely homicidal ideations are proposed to have a number of unique functions, including:

- The recognition of adaptive problem contexts potentially and uniquely solvable by homicide
 - The cognitive rehearsal of strategies that employ homicide in order to:
 - construct homicidal strategies most likely to avoid the costs associated with homicide by anticipating probable contingencies
 - aid in their evaluation as a suitable solution relative to other possible solutions
 - The patterning of emotions and desires to *prevent* homicidal behavior in contexts where another solution was ancestrally likely to produce a better fitness outcome on average
- OR
- The patterning of emotions and desires to *produce* homicidal behavior where homicide was likely to produce the best fitness outcome on average.

Don Symons (1979) argues that sexual fantasies function to deal with rare, complex problems associated with mating opportunities, which have a large potential impact on individual reproductive success and hence genetic fitness. Even if only a small number of sexual fantasies are ever consummated, Symons argues, evolved design to

produce sexual fantasies will be selected for to the extent that they facilitated a successful sex act. Consistent with this logic, homicidal ideations may function to facilitate exploration of the best design space of murderous solutions for highly fitness relevant adaptive problems. Most thoughts of killing, like fantasies of having sex, will not be followed through because the costs associated with pursuing such a strategy will be evaluated to outweigh the benefits, or rare opportunities to pursue the strategy will not materialize.

A hypothesis based on this logic is that homicidal strategies that require a greater degree of complexity in their successful implementation would be more likely to spawn homicidal fantasies than homicidal strategies that are less complex. For example, determining a way to murder a high-status, physically formidable rival is a more complex problem than finding a way to kill a deformed or diseased newborn. Natural selection would have more likely selected for explicit ideation in the service of successfully implementing homicide of a rival. The elimination of a newborn could be handled without conscious ideation, through neglect, “shaken baby syndrome”, or other, less complex motivational systems.

Other possible functions of homicidal fantasies

It is possible that thoughts of killing do not have the functions proposed by homicide adaptation theory. There are at least two other possible functions that are also consistent with adaptationist logic. First, thoughts of murder may function only to motivate behavior in a certain direction other than actually killing. This alternative is consistent with the idea that the thoughts of which we are consciously aware are not true

representations of the world around us, but instead serve to steer behavior in adaptive directions. A weakness of this explanation is that it is not clear what specific behaviors other than homicide that murder fantasies may function to motivate. It is also not clear why selection would produce thoughts of homicide to motivate nonhomicidal behaviors instead of making the motivational weightings of thoughts more consistent with the desired behaviors capable of producing those behaviors.

A second alternative function of homicidal thoughts may be to make threats of homicide more credible. Consistent with the logic of Trivers's (2000) theory of self-deception, if people believe that they might kill someone they will be able to make more credible threats that they will actually go through with the act of murder. It is possible that this theory may explain the existence of some homicidal thoughts. Two pieces of data suggest, however, that this explanation will be unable to explain the majority of homicidal thoughts. First, according to research of people's homicidal fantasies conducted by Buss and Duntley (under review), not a single research participant of the over 5000 surveyed across multiple studies threatened to kill the person in their thought. Second, research on spousal homicides indicates that as many as 82% of men who kill their romantic partners threatened to kill them in the weeks or months prior to the murder (Jordan, Nietzel, & Logan, 2004).

Previous research on homicidal fantasies

Only two previous studies have examined homicidal ideation in the general population. Both of them adopted Daly and Wilson's byproduct theory to guide their exploration of people's homicidal fantasies (e.g., Crabb, 2000; Kenrick & Sheets, 1993).

Crabb, for example, suggests that “psychological machinery for aggressive impulses would have served inclusive fitness well, with the caveat that extreme aggression leading to homicide may be disastrous for inclusive fitness because it may result in fatal retribution against the perpetrator” (Crabb, 2000, p. 226).

The present research examined people’s homicidal fantasies from the explicitly adaptationist perspective proposed by Homicide Adaptation Theory. Rather than examining people’s most *recent* homicidal fantasies, the research explored people’s most *memorable* thoughts of killing another person. In previous research, participants’ fantasies were often fleeting and their reports of their most recent homicidal thought were often lacking in detail (Kenrick & Sheets, 1993; Crabb, 2000). People’s most memorable homicidal thoughts, in contrast, may be richer in details that would allow for a more complete evaluation of their content and their consistency with Homicide Adaptation Theory. Additionally, examination of people’s most memorable homicidal fantasies allows the research to look farther back into the lifespan of participants at events that lead them to consider murder.

Hypotheses about the design features of adaptations for homicidal ideation

The proposed research is unique in being explicitly guided by an adaptationist theory of homicide. The theory that homicidal fantasies are the functional products of adaptations for homicide allows for the generation of more specific hypotheses than is possible using previous theories. Homicide Adaptation Theory proposes that there are universal design features of men’s and women’s psychology of homicide. Where men and women faced similar adaptive problems in ancestral environments, the design of their

homicide mechanism should be similar. Where men and women faced different adaptive problems the function of their homicide adaptations should be different.

Where possible, points of contrast will be drawn between previous theories and homicide adaptation theory. However, a direct comparison is not possible for many general theories that are not currently formulated to generate competing hypotheses at the same level of specificity. It is difficult to contrast hypotheses generated by Homicide Adaptation Theory with hypotheses generated by many of the other theories of murder because most nonadaptationist theories of homicide describe the general influence of a specific factor on the likelihood of engaging in criminal activity. It is rare for any of these theories to discuss homicide specifically. Homicide Adaptation Theory, in contrast, generates hypotheses about the functional operation of specific psychological decision rules devoted only to homicide. Additionally, many theories of homicide provide explanations at a level of analysis that is complementary and orthogonal to Homicide Adaptation Theory, such as the psychopathology theories, personality theories, and the other individual difference theories. These theories often cannot be contrasted with Homicide Adaptation Theory because each level of explanation is formulated to explain different aspects of the psychology of homicide.

Hypotheses about universal design of homicidal ideations

Hypothesis 1: The majority of homicidal fantasies will involve killing others who are not genetically related. As Hamilton (1964) argues in his Inclusive Fitness Theory, selection should have operated in humans and other animals to produce desires and behaviors that favor genetic relatives over nonrelatives. Genes that contribute to the

development of adaptations for nepotistic behaviors will help ensure copies of themselves make it into the next generation both by contributing to the reproductive success of the vehicle in which they reside and by contributing to the success of other vehicles that also carry copies of them. The evolution of adaptations for nepotism should create a degree of prohibition against the use of homicidal strategies against genetic relatives.

This hypothesis runs contrary to the proximity theory of homicide (Fagan, Piper, and Yu-The Cheng 1987), which proposes that people are more likely to kill others around them with whom they spend the most time. Typically, people spend the most time with their family members.

Hypothesis 2: Men and women will indicate that retribution from kin is as likely to deter them from actually killing the person they fantasized about murdering as being caught by the police. Over most of our evolutionary history, there was no organized police force. It would have been up to the genetic relatives of homicide victims to seek retribution for the murder of their family members. There would have been strong selection pressure for the kin of murder victims to seek retribution against killers to avoid costs, such as being identified as easily exploitable and being victimized by the killer in the future. Even in modern times, the family members of murder victims often require counseling to prevent them from immediately taking the law into their own hands and killing the person who ended the life of their kin (Mezey, Evans, & Hobdell, 2002; Riches, 1998; Amick-McMullan, Kilpatrick, Veronen, & Smith, 1989). Our long evolutionary history of family members seeking vengeance for the murder of their kin may have selected for design features of homicide adaptations that lead people to factor

in the potential retribution from kin as a significant potential cost, decreasing the likelihood that they will actually murder the person in their fantasy. This is hypothesized to occur despite the fact that, in modern environments, the likelihood of retribution from kin has been far diminished and punishment by police and the courts is more likely.

Only Homicide Adaptation Theory is specific enough about the design features of psychological adaptations for murder to generate this prediction. No other theory of killing or criminality specifies how the mind processes information from the environment about the potential costs of murder.

Hypothesis 3: There will be a significant, positive relationship between participants' ratings of how close they came to killing the person in their fantasy and the intrusiveness of their homicidal thoughts. Functions of homicidal ideations include evaluating the costs and benefits of killing, running mental simulations of the murder, and motivating homicidal behavior. Greater time investment would be required for the more detailed exploration of factors that would influence the feasibility of a homicidal strategy. As homicide is evaluated to be a more feasible solution to a problem of social conflict, people should report a higher frequency and greater duration of their thoughts.

This hypothesis differs from those generated by other theories of homicide because it focuses on specific design features of the hypothesized psychological adaptations for homicide. Some forms of psychopathology, including obsessive-compulsive disorder (OCD), are also associated with intrusive thoughts (Calamari & Janeck, 1998). However, in OCD, those thoughts are unwanted and have a negative impact on normal activities of daily living. Current evidence suggests that normally

occurring fantasies do not have a negative impact on people's lives (Lanlois, Freeston, & Ladouceur, 2000). Even if OCD accounted for some of the variance in the experience of thoughts of homicide, the base rate of the disorder is sufficiently low that it could not explain the majority of people's murder fantasies (Nestadt, Bienvenu, Cai, Samuels, & Eaton, 1998). Those thoughts influenced by OCD that may occur in the present sample are likely not frequent enough to generate the hypothesized relationships.

Hypothesis 4: When men and women experience a homicidal fantasy as a result of their romantic partners' infidelity or cues to infidelity, they will be more likely to think of killing the intrasexual rival who their partner is cheating with rather than their romantic partner. On average, a person's romantic partner is of greater value to them than the person they may be cheating with. A romantic partner is a potential source of tangible and reproductive resources, as well as other sources of investment. Natural selection should have favored mechanisms to eliminate the person who is creating a threat of partner infidelity, when possible, before eliminating the romantic partner.

This hypothesis is not consistent with a number of previous theories of homicide. It is inconsistent with Proximity Theory, which would suggest that romantic partners would be more likely targets because more time is spent with them. It is not consistent with Byproduct Theory, since homicide as a maladaptive byproduct of other mechanisms does not possess the design features required to systematically choose between two victims if they are both inflicting costs. It is also inconsistent because, in the case of mate homicide, Daly and Wilson (1988) propose that homicide is the overreactive

mistake of mechanisms designed to coerce and control mates. They make no such claim for the rivals with whom mates are cheating.

Hypothesis 5: Sexual coercion will lead to more frequent, longer duration homicidal thoughts in victims of rape than among the genetic relatives and friends of victims.

The bypassing of female choice that occurs in rape and the reputational damage that can be suffered in the aftermath of sexual coercion is much greater for the victims of rape (primary victims) (Moore, 1998) than for their kin and coalitional allies (secondary victims). The greater magnitude of costs experienced by the primary victims of rape than the secondary victims is hypothesized to have selected for more frequent, longer duration murder fantasies in rape victims. This is an indication that primary victims may have functional cognitive biases that lead them to be more likely to consider homicide as a possible solution to the negative fitness consequences of victimization, particularly reputational damage.

Women's average investment in reproduction is greater than men's. As a result, poor mating decisions are more costly for women than for men (Trivers, 1972). The costs of being the victim of coercive sexuality are greater for women than men, possibly resulting in an unwanted pregnancy with an undesired partner, reputational damage, damage to mate value, and the opportunity costs of being unable to pursue a desired mateship.

Other theories of homicide have not specified cognitive design features of homicidal ideations at this level of specificity, making direct comparisons difficult. This

hypothesis runs counter to a number of more general theories of sex differences in homicide that argue men should be more likely to engage in violent acts, including murder. The vast majority of victims of rape are women (Ghiglieri, 1999). In contexts of sexual victimization, an adaptationist perspective predicts that murder fantasies may be a functional component of women's psychology to stanch the negative reputational consequences of their victimization.

Hypothesized sex differences in the design of homicide adaptations

Hypothesis 6: Men will be more likely than women to report experiencing a homicidal thought as a result of a romantic partner's infidelity or cues to infidelity.

Fertilization occurs internally within women. As a result, women are always certain that they are genetically related to their offspring. Men can be less than completely certain that the offspring they have with a romantic partner are their genetic relatives (Symons, 1979). Over evolutionary time, this is argued to have selected for adaptations in men to prevent partner infidelity and avoid investing in offspring who were fathered by rivals. Male sexual jealousy has been argued to be one adaptation against partner infidelity (Buss, 2000). Homicide may have evolved to be another solution to the problem of paternity uncertainty.

Only the logic of Homicide Adaptation Theory is clearly consistent with this hypothesis. Byproduct theory, if it coopted the argument that homicidal ideation may function to make threats more credible, could make the argument that this pattern in murder fantasies is consistent with male coercion and control of female partners. This, however, is not an argument that has been made by byproduct theorists and seems a less

parsimonious solution than the adaptationist hypothesis consistent with Homicide Adaptation Theory.

Hypothesis 7: Women will be more likely than men to experience homicidal thoughts as a result of assaults to their sexual reputations. Sexual reputation is more important to women than to men across cultures, perhaps because it is a more important determinant of mate value among women than among men (Bennett, 2005; Buss, 2004; Campbell, 1999; Gorgen, Yansane, Marx, & Millimounou, 1998). Given its importance to women, derogation of sexual reputation has been argued to be a strategy women use against one another in competition for mates (Schmitt & Buss, 1996). In some ancestral contexts, homicide may have been a possible solution for the elimination of an intrasexual competitor who inflicted significant damage to a woman's sexual reputation. Women's fantasies of killing rivals who attacks their sexual reputations may be part of the designed output of psychological adaptations selected to ameliorate reputational damage.

This hypothesis is unique from those generated by other theories of homicide in indicating the specific components of status that are likely to be important in triggering women's thoughts of killing intrasexual rivals. Post hoc, this hypothesis could be considered compatible with Byproduct Theory, which postulates that homicide is an epiphenomenon of the normal functioning of evolved mechanisms. Byproduct theorists could argue that adaptations to produce violence in response to attacks on sexual reputation could bubble over and accidentally kill the source of the status damage.

Byproduct theory, however, would have difficulty explaining why people would produce thoughts of killing rather than thoughts of acting violently, but nonlethally.

Also post hoc, social learning theory may attribute the hypothesized sex difference to differences in the way that boys and girls are socialized. Social learning theory, however, would have to explain why the sex difference in status insults is cross-culturally universal (Daly & Wilson, 1988).

Chapter 3 – New Research on Homicidal Ideation

Evidence to test these hypotheses comes from a study of homicidal ideation conducted in the community surrounding the University of Texas in Austin, Texas over a two year period. Participants were asked to report the content of their most vivid or memorable thought of killing another person in as much detail as possible. They were also asked to describe the events that led them to have the thought and their relationship to the person they fantasized about killing. This technique differs from that used by Kenrick & Sheets (1993) who asked participants to report their most recent homicidal fantasy. By asking participants to report their most vivid or memorable thought of murder, we hoped to gather evidence more likely associated with ancestral patterns of homicide. A person's most vivid, memorable homicidal thought, according to this logic, may be triggered by a clearer pattern of environmental cues ancestrally associated with the confrontation of an adaptive problem solvable by homicide. Homicidal thoughts described by participants in the research often recur over periods of days, weeks, months, and sometimes years. They involve detailed scenarios about means, motives, and opportunities.

Participants

Six hundred twelve men and 556 women who lived and worked in the Central Texas community participated in the research. The average age of female participants was 19.7 years. The average age of male participants was 19.6 years.

Materials

Participants responded to a survey that was divided into several sections. The first section included questions to gather demographic information about the participants, such as their sex, age, and socioeconomic status. The second section asked participants to estimate the frequency with which they had homicidal thoughts in the past and to estimate the number of different people they fantasized about killing over various time intervals, ranging from the past 24 hours to the past five years. The third section asked participants to describe their most memorable homicidal thought, including the precise events that led them to experience the thought, the content of their thought of killing, the factors that prevented them from actually killing the person in their thought, and factors that could have “pushed them over the edge” and led them to actually murder the person in their fantasy. The final section of the survey asked participants to rate how close they came to actually murdering the person in their thought, and to estimate their likelihood of killing if the situation that triggered their thought was different in ways that either increased or decreased the costs of the homicide [see appendix A].

As in Kenrick and Sheets’ (1993) research, the instructions were worded to avoid the implication that homicidal fantasies are counternormative. Indeed, their research demonstrated that thoughts of killing are quite pervasive and likely quite normal. The instructions were worded as follows:

Research has shown that many normal people occasionally have thoughts about homicide. We think that some situations more than others cause people to think about killing someone else. This survey was designed to examine your thoughts about these situations.

Some of your thoughts about killing someone else may have been more vivid (detailed, intense) or memorable than others. Think of the most vivid or memorable

thought about killing someone else you ever had. Please only include information in your responses that was part of your original thought.

Procedure

Participants were approached in groups at community meetings, community gathering places, and in the workplace and asked to complete the survey used in this research. If they agreed, they were asked to read carefully and sign an informed consent form. They were then left to complete the instrument and asked to return it to the researcher when finished. Upon returning their completed survey, participants were given a standard debriefing form and thanked for their participation.

Data Coding

Because many questions were open-ended, some variables required coding for subsequent analysis. All data coding was completed independently by two trained researcher assistants. The inter-rater agreement for data coding of the relationship between the participant and the person they thought of killing was 99 percent. The inter-rater agreement for data coding of the triggers of participants' murder fantasies was 87 percent. The author subsequently resolved any disagreements between coders.

The same categories utilized by Daly & Wilson (1988) in their research on actual homicides, were used in the present research to identify the relationship between participants and the people they fantasized about killing. The category "Intrasexual Rival" refers to all individuals of the same sex who were not genetic relatives. "Mate" refers to a current or former romantic relationship partner, most typically of the opposite sex. "Kin" refers to genetic relatives. "Strangers" refer to individuals with whom the participants were not acquainted in any way. An additional category was also included.

“Opposite-sex Rival” refers to individuals of the opposite sex who participants thought of killing, but were not mates.

Similar categories to those used by Daly & Wilson (1988) were also used to categorize the reasons why participants indicated they experienced a homicidal thought. In subsequent data presentation, these are sometimes referred to as the “triggers” of their murder fantasies. The category “Sexual infidelity” refers to a situation in which the participant believed that their current romantic partner had been sexually unfaithful with someone else. It only included sex acts involving genital contact, such as sexual intercourse, oral sex, or manual sexual stimulation. The category “Rape” refers to a context in which homicidal thoughts were triggered by the sexual victimization of the participant or someone the participant cared about. “Sexual reputation” refers to circumstances in which participants reported that their murder fantasies were triggered by another individual damaging their sexual reputations by spreading information about their sexual history, true or fictitious, to other individuals in their social group.

Results

As illustrated by Figure 1, more than 76% of women (N=422) and 91% of men (N=545) reported having at least one vivid, memorable homicidal thought. Men were significantly more likely to report experiencing a murder fantasy than women, $\chi^2(1)=15.64$, $p<.001$. Men also reported experiencing significantly more thoughts of killing in the previous year than women (9.8 vs. 3.4), $t(919)=3.29$, $p=.001$, Cohen’s $d=.22$, as shown in Figure 3. They also had fantasies of killing more different people than women in the previous year (3.39 vs. 1.21), $t(893)=3.73$, $p<.001$, Cohen’s $d=.25$, as

shown in Figure 4. These findings replicate those of Kenrick & Sheets (1993) and Crabb (2000). These analyses and all subsequent analyses make use of the same statistical techniques utilized in their previous research.

Figure 1: Percentage of men and women reporting homicidal thoughts

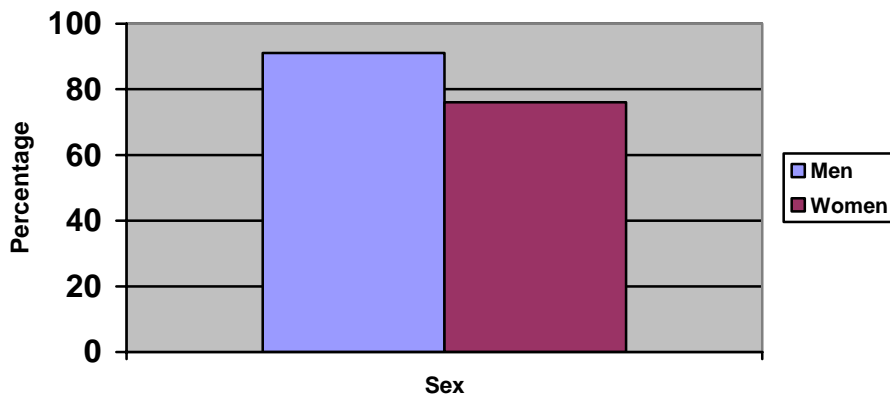


Figure 1: The majority of both men and women reported experiencing one homicidal thought in their lifetime. Men were significantly more likely to report having at least one thought of killing than women.

Figure 2: Mean number of thoughts men and women experienced in the previous year

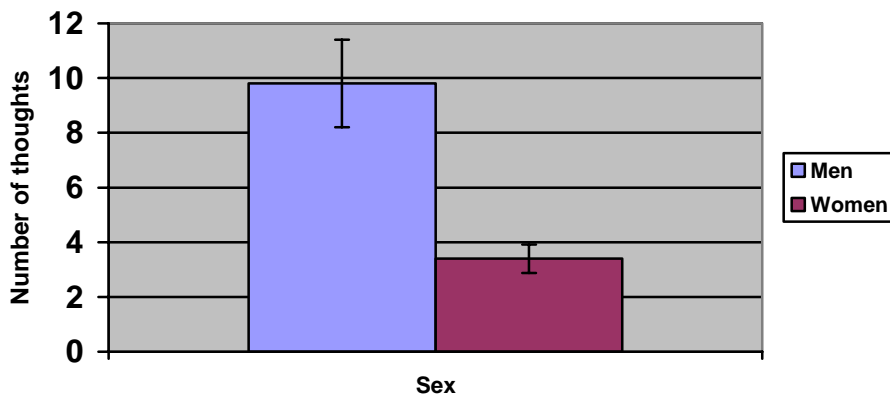


Figure 2: Men reported experiencing significantly more homicidal thoughts in the previous year than women.

Figure 3: Mean number of different people participants fantasized about killing in previous year

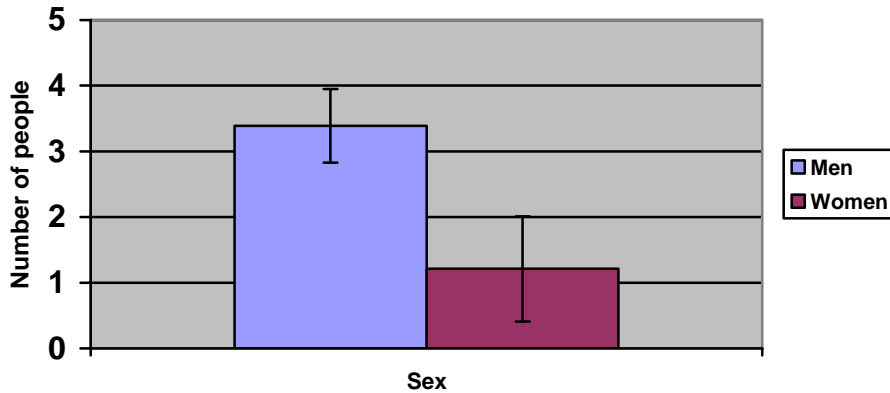


Figure 3: Men fantasized about killing significantly more people in the previous year than women.

Figure 4 illustrates the pattern of relationship between the research participant who is having the homicidal thought and the person they thought of killing. As the figure illustrates, thoughts of killing same sex rivals dominate men's most vivid, memorable homicidal fantasies, corresponding to the empirical fact that most homicides involve intrasexual rivalry (Daly & Wilson, 1988). Men are far more likely to have these thoughts than women, $\chi^2(1)=74.31$, $p<.001$, also corresponding to the actual rates of homicide.

Similar to the male participants, the majority of women in our sample reported that the object of their most vivid, memorable murder fantasy was an intrasexual rival, but to a lesser extent than men. Women were more likely than men to report experiencing a fantasy of murdering an opposite sex rival, $\chi^2(1)=22.73$, $p<.001$. The percentage of women's thoughts of killing family members was higher than men's,

$\chi^2(1)=7.615, p=.006$. Men were more likely than women to report thoughts involving the murder of a current or former romantic partner $\chi^2(1)=7.37, p=.007$.

Figure 4: Relationship between killer and victim in homicidal ideations

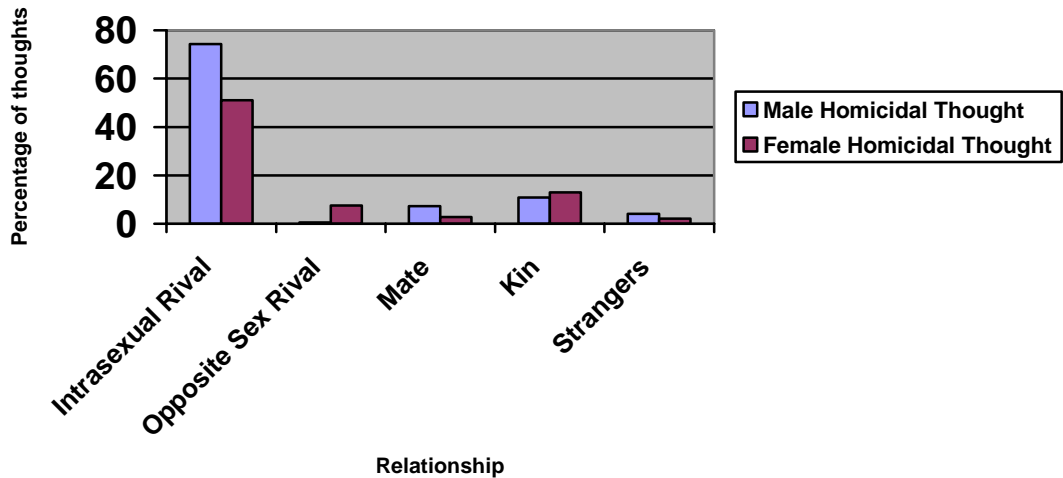


Figure 4: Men and women most frequently report experiencing homicidal ideation in which an intrasexual rival is the victim.

The majority of homicidal fantasies reported by participants involved killing individuals who were not genetically related, $\chi^2(1)=433.14, p<.001$. Eighty-nine percent of men and 80 percent of women indicated that a non-relative was the object of their murder fantasy, as shown in Figure 5. Women were significantly more likely to report fantasizing about killing genetic kin than men, $\chi^2(1)=5.2, p=.02$.

Figure 5: Percentage of participants reporting fantasies of killing non-kin

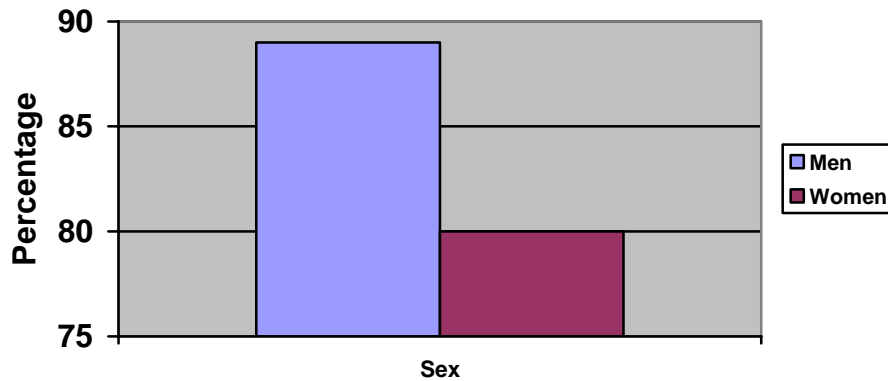


Figure 5: Most participants reported experiencing fantasies of killing individuals who were not genetic relatives. Women were more likely than men to report having a thought of murdering a family member.

Participants' ratings of the likelihood they would kill the person in their thought on a 0-100 point scale were significantly higher if they knew they would not be punished by the family members of the victim (7.3 vs. 14.8), $t(299)=5.6$, $p<.001$, Cohen's $d=.32$. Participants' ratings also differed as a function of whether they knew they could avoid other kinds of costs. For example, participants rated the likelihood they would have killed the person in their thought as significantly higher if the crime was not discovered than if they knew they would not be punished by the victim's kin (17.8 vs. 14.8), $t(269)=2.79$, $p=.006$, Cohen's $d=.27$. This difference disappeared, however, in participants' ratings of the likelihood they would kill if they knew they would not be punished by the police versus if they knew they would not be punished by the family of the victim (15.6 vs. 14.9), $t(298)=1.03$, n.s., Cohen's $d=.02$. These trends are illustrated in Figure 6.

Figure 6: Ratings of the likelihood of killing in different conditions of decreased costs

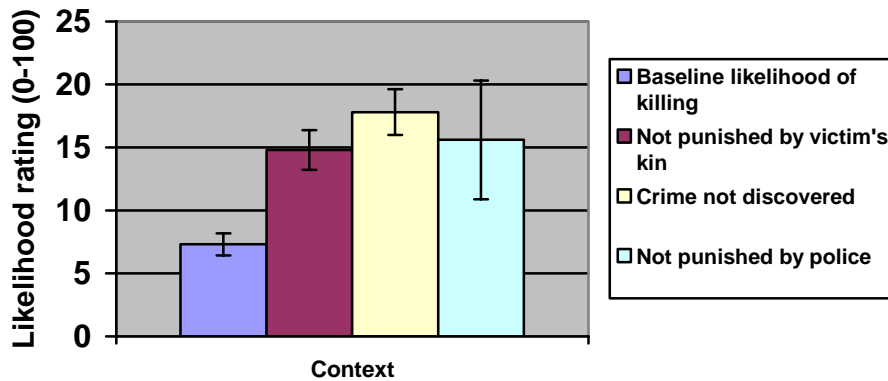


Figure 6: Participants' ratings of the likelihood they would kill if they knew they would not be punished by their victim's kin and if they knew they would not be punished by police were not significantly different.

There were significant sex differences in participants' overall ratings of the likelihood they would kill across different conditions of decreased costs, as shown in Figure 7. Men rated the likelihood of actually killing the person in their thought to be higher than women (11.3 vs. 6.8), $t(908)=3.14$, $p=.002$, Cohen's $d=.21$. Male participants' ratings of the likelihood they would have killed if they knew they wouldn't be punished by the victim's family also surpassed women's ratings (18.09 vs. 10.01), $t(299)=2.3$, $p=.01$, Cohen's $d=.28$. If they knew the crime would not be discovered, men indicated that they would be more likely than women to murder the person in their thought (27.7 vs. 14.7), $t(837)=5.8$, $p<.001$, Cohen's $d=.41$. The same was true for men's and women's ratings of the likelihood they would kill if they would not be punished by the police (30.24 vs. 13.1), $t(641)=6.1$, $p<.001$, Cohen's $d=.55$.

Figure 7: Sex differences in ratings of likelihood of killing in different conditions of decreased costs

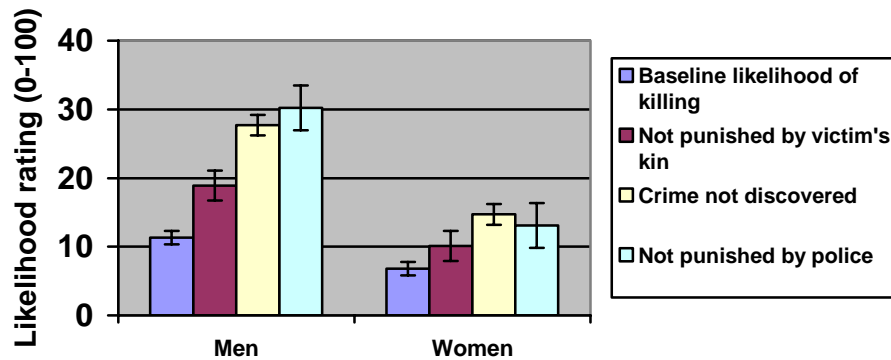


Figure 7: Men's ratings of the likelihood they would kill across contexts of decreased cost were significantly higher than women's ratings.

Participants' ratings of how close they came to actually killing the person in their homicidal fantasy was significantly correlated with the number of times they reported experiencing thoughts of killing that person each day, $r=.20$, $p<.001$, and each week, $r=.18$, $p<.001$. Ratings of the likelihood of killing the person, however, were not correlated with the duration of each fantasy of killing the person, $r=-.009$, n.s. The same significant correlations are apparent in each sex individually. Men's ratings of how close they came to killing the person in their thought were significantly correlated with the number of times they reported experiencing thoughts each day, $r=.17$, $p<.001$, and each week, $r=.15$, $p<.001$, but were not correlated with the duration of their thoughts, $r=-.03$, n.s. Women's ratings of how close they came to killing the person in their thought were also significantly correlated with the number of times they reported having homicidal fantasies of murdering the person each day, $r=.24$, $p<.001$, and each week, $r=.26$, $p<.001$, but not with the duration of their thoughts of killing the person, $r=.009$, n.s.

Table 1: Correlations between ratings of the likelihood of killing and the frequency and duration of homicidal fantasies

	Correlation between likelihood of killing and frequency of thoughts each day	Correlation between likelihood of killing and frequency of thoughts each week	Corrleation of likelihood of killing and average duration of thoughts
Combined	r=.20, p<.001	r=.18, p<.001	r=-.009, n.s.
Men	r=.17, p<.001	r=.15, p<.001	r=-.03, n.s.
Women	r=.24, p<.001	r=.26, p<.001	r=.009, n.s.

Table 1: There was a significant correlation between men’s and women’s ratings of the likelihood they would actually kill the person in their thought and the frequency of their thoughts each day and each week. The correlations between men’s and women’s ratings of the likelihood they would kill and the average duration of their thoughts was not significant.

When men experienced a homicidal fantasy as a result of their romantic partner’s perceived infidelity, they were significantly more likely to think of killing the intrasexual rival with whom their mate was cheating than their mate, $\chi^2(1)=29.38, p<.001$. Eighty-two percent of men reported thinking of killing their intrasexual rival; the remaining 18 percent targeted their romantic partner in their murder fantasy. Women, however, did not show this trend, yielding a statistically equivalent likelihood of experiencing thoughts of killing their intrasexual rivals (54%) and romantic partners (46%), $\chi^2(1)=0.59, n.s$. These trends are illustrated in Figure 8.

Figure 8: Victims in homicidal fantasies triggered by mate's sexual infidelity

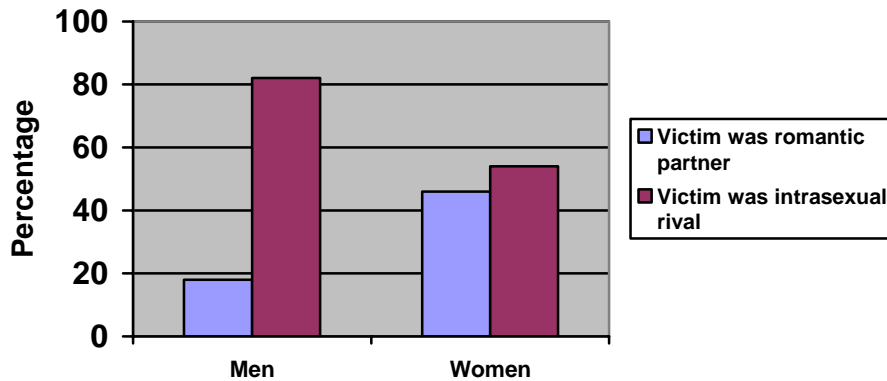


Figure 8: Significantly more men indicated that their partner's sexual infidelity led them to think of killing the rival with whom their mate was cheating than to think of killing their romantic partner. Among women, there was no significant difference in whom they were more likely to think of killing.

All 15 women in our sample who reported that their murder fantasy was triggered by rape were the victims of rape. All of the 17 males in our sample who reported that their thought of killing was triggered by rape were the boyfriends of rape victims. As illustrated by Figure 9, the boyfriends of rape victims reported experiencing significantly more thoughts of killing the rapist each hour than rape victims did (1.2 vs. .20), $t(21)=2.21$, $p=.04$, Cohen's $d=.96$. There was no difference in how frequently the friends of rape victims and the victims of rape thought of killing the rapist each day (4.2 vs. 1.3), $t(24)=1.15$, n.s., or each week (6.7 vs. 3.6), $t(23)=.69$, n.s. There was also no difference in the duration of murder fantasies reported by rape victims and their boyfriends (46.5 minutes, $SD=129.9$, vs. 9.7 minutes, $SD=31.77$), $t(27)=1.03$, n.s. There was, however, a significant difference in the groups' ratings of how close they came to actually killing the rapist. The boyfriends of rape victims rated their likelihood of actually killing the rapist

on a 0-100 point scale significantly higher than rape victims (18.1 vs. 1.4), $t(29)=2.17$, $p=.04$, Cohen's $d=.81$, as shown in Figure 10.

Figure 9: Frequency of thoughts of killing rapists each hour by victims and boyfriends of victims

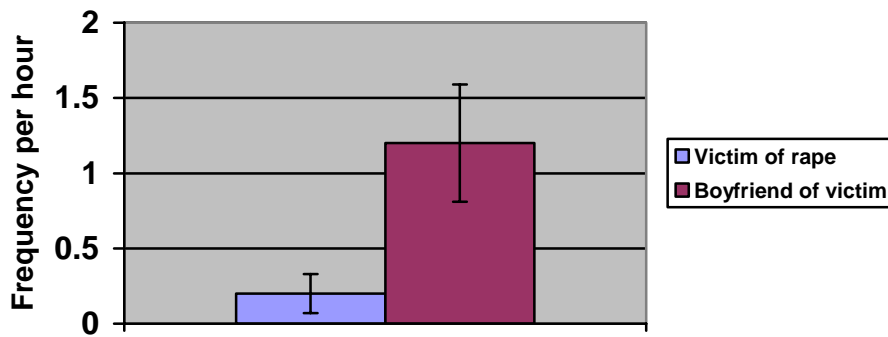


Figure 9: The boyfriends of rape victims reported a significantly higher frequency of thoughts of killing the rapist than rape victims reported.

Figure 10: Ratings of how close rape victims and their boyfriends came to actually killing the rapist

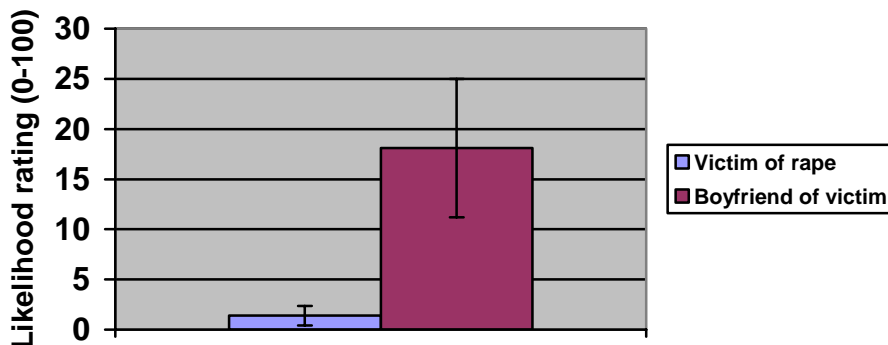


Figure 10: Rape victims' boyfriends indicated that they came significantly closer to killing the rapist than did the victims of rape.

Men were significantly more likely than women to indicate that they experienced a murder fantasy as a result of a romantic partner's infidelity or cues to their infidelity,

$\chi^2(1)=5.22, p=.02$. More than twice as many men (10.1%), than women (4.9%) indicated that their partner's sexual infidelity or suspicion of their partner's infidelity was a factor in triggering their homicidal ideation.

Figure 11: Percentage of participants reporting murder fantasies triggered by a mate's sexual infidelity

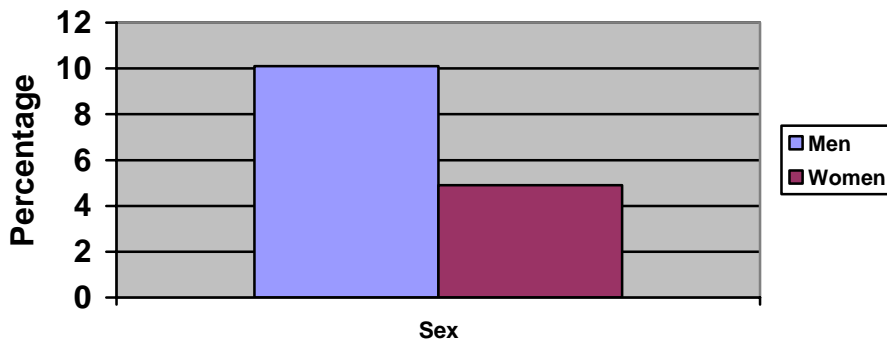


Figure 11: Significantly more men than women reported that their most vivid, memorable murder fantasy was triggered by their romantic partner's actual or suspected sexual infidelity.

Women were significantly more likely than men to report that damage to their sexual reputation was a factor that contributed to triggering their thoughts of killing, $\chi^2(1)=6.4, p=.01$. Six percent of women, but less than two percent of men reported that damage to their sexual reputation by another individual was a factor that led them to think about killing the person.

Figure 12: Percentage of participants reporting thoughts of killing triggered by damage to their sexual reputation

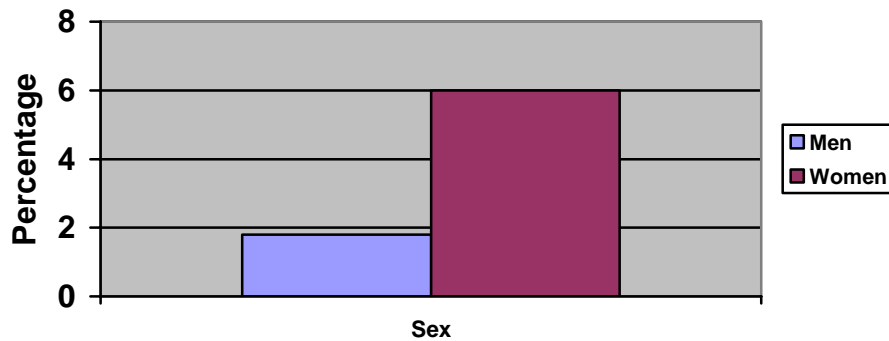


Figure 12: More women than men reported that their thought of killing someone else was triggered by damage to their sexual reputation.

Discussion

The data from the study presented here yielded several interesting findings. First, the vast majority of people's homicidal fantasies involved killing people who were not genetically related to them. This finding is consistent with Homicide Adaptation Theory, which applies the logic of inclusive fitness theory (Hamilton, 1964) to understanding the selection pressures that shaped adaptations for homicide. The murder of genetic relatives should be selected against in most circumstances because, in doing so, individuals eliminate vehicles that share common genes, putting kin killers at an evolutionary disadvantage relative to those who are less likely to murder family members.

The rates of eleven percent of men and 20 percent of women reporting thoughts of murdering genetic relatives still seems a bit high. This may be partially attributable to the youth of the community participants who completed the study measures. The mean age of both men and women who participated in the study was about 20 years old. A

significant proportion of the participants had not spent a substantial amount of time living away from their families. An older sample may yield an even lower rate of thoughts of killing genetic relatives. For most of our evolutionary history, however, our ancestors likely lived with an extended kin group for most of their lives. The current nuclear family system is likely a recent evolutionary event, leading to less contact with extended family members for us than for our ancestors.

Consistent with the second hypothesis, there was no difference in participants' ratings of the likelihood they would kill the person in their thought in two different conditions of decreased costs: No punishment by police and no punishment by the family of the victim. On the surface, this finding may seem counter-intuitive. The probability of being punished by the police in the United States is significantly higher than the likelihood of being punished by family members. Violent retribution by family members is punishable by the same set of laws as the offense that spawns it. A social learning perspective might argue that people would be more likely to identify the police as a more significant source of costs than the family members of the victim. This finding is consistent with the hypothesis that men and women may have an evolved information processing bias that leads them to factor in retribution from kin as a significant cost associated with adopting a strategy involving homicide because our modern legal system did not exist for most of our evolutionary history. Victims' kin were among the most likely individuals to exact revenge for the murder of their genetic relative in order to avoid gaining a reputation of being exploitable, to eliminate a probable source of future costs, and to send a signal to others of the ultimate outcome of attempting to exploit their

kin group. This finding cannot be accounted for by a lack of differences in participants' ratings of their likelihood of killing across different kinds of decreased costs. Significant differences were found between all other conditions of decreased costs tested. The comparison of decreased costs specifically inflicted by different groups of people seemed the most appropriate test of the hypothesis that men and women may possess an information processing bias shaped by ancestral selection pressures that leads them to overestimate the likelihood of incurring costs from the genetic relatives of victims in modern times.

Also interesting is the greater variance in participants' ratings of the likelihood they would kill if they knew they would not be punished by the police than if they knew they would not be punished by the victim's family. This is consistent with the hypothesis that the kin of victims were the primary ancestral enforcers of retribution against killers. Recurrent ancestral revenge from the family members of murder victims would have selected for psychological mechanisms that represent a specific range of the probable likelihood and severity of costs that would be inflicted by kin, which often would have been the murder of the killer. Since organized police forces and judicial systems that hand out measured punishments for murder are likely recent cultural inventions, we should expect that psychological mechanisms to represent the costs from community law enforcement did not evolve, or did not evolve to represent the probable costs of punishment by police in as narrow a range, instead requiring a greater amount of environmental input to be constructed. Information about the probability and magnitude of costs inflicted by law enforcement, by this account, would be recognized by

psychological adaptations for homicide and lead to a recalibration of the costs of murder. Differences in individual experience or knowledge of law enforcement as well as differences in the penalties of homicide occurring across distinct contexts may be sources of the greater variance in participant ratings of the likelihood they would kill if not punished by the police. A number of different factors may contribute to variation in participants ratings of the likelihood they would kill in conditions of decreased costs, such as variation in mate value, anticipated future status trajectories, and likelihood of success in the execution of different strategies. Future research will explore the contribution of these factors.

It is interesting that police and jails appear to deter people from actually committing homicide, even though they probably were not part of human ancestral environments. One possibility is that psychological mechanisms for fear of retribution from a kin group may be parasitized by community law enforcement. Another is that ancestral human societies did have some form of enforcement of community rules that prohibited certain forms of homicide, much the same way that modern legal systems do. Finally, humans may possess two different systems for estimating the costs of committing murder: one sensitive to the range of possible forms of retribution and another that identifies the parties most likely to administer them. Future research should explore the existence of the hypothesized mechanisms in greater detail. One direct method would be to survey people convicted of homicide about which sources of costs and the kinds of costs they feared the most. Murderers, however, may have “decided” to adopt a homicidal strategy partly because of the absence of certain kinds of costs.

Although this finding is consistent with Hypothesis 2, it is possible that a confound in the measure may have contributed to participants' responses. Both items asked participants to rate the likelihood they would kill if they would not be punished. Perhaps their average ratings were similar not because they viewed the probability or costs of being punished by the kin of the victim and the police as being similar, but because they perceived all punishments, regardless of who administered them, to be similar. This argument, however, cannot explain the greater variance in participant ratings of the likelihood they would kill if not punished by the police than if not punished by the kin of the victim. To help address the issue raised by this possible confound, future research will evaluate participants' responses to open-ended items that asked them to indicate the factors that prevented them from actually killing the person in their murder fantasies. It will also ask more specific questions about the probability and magnitude of costs that would be inflicted by the genetic relatives of victims and by law enforcement both across all homicidal fantasies and within specific contexts of homicide. This could provide greater insight into the sources of variance in participants' representations of the costs of killing.

Consistent with Hypothesis 3, participants' who indicated a greater likelihood of actually killing the person in their thought also experienced more thoughts of killing the person on a daily and weekly basis. This finding provides support for the argument that greater cognitive effort would be required for homicidal fantasies more likely to be translated into homicidal behavior. It is also consistent with adaptationist logic on homicidal ideation in that cognitive adaptations devoted to solving adaptive problems

should apportion more cognitive effort to more complex problems, especially those that are more likely to be enacted.

People's estimates of the average duration of their homicidal thoughts, however, were not correlated with their ratings of how close they came to killing the person in their fantasy. There are a number of possible reasons for this inconsistency. First, people may not be very good at estimating how much time they spend thinking about different topics. Perhaps they are even less accurate at remembering how much time they spend thinking about different topics, which our survey asked them to do in estimating the duration of their fantasies of killing. It is possible that errors in participants' estimates and memories led to the failure to find the hypothesized relationship.

Second, the number of times people experience homicidal thoughts may provide subtly different information about their psychology of homicide than the duration of the thoughts they experience. The frequency of thoughts of killing another person may be a window into how serious an adaptive problem created by the other person is. When it is triggered numerous times over the course of a day or week, the frequency of a murder fantasy may be an indication of the number of different contexts and relationships the adaptive problem influences as a person moves from one situation to another and one interpersonal interaction to another over time. The duration of a homicidal fantasy, however, may only be an indication of the complexity of action and cascading costs and benefits associated with adopting murder as part of a solution to a particular problem of social conflict.

Third, the frequency and duration of homicidal thoughts may vary as a function of time and also as a function of uncertainty. An individual may face numerous, significant adaptive problems simultaneously and only be able to devote a small amount of time to homicide as a solution to a particular problem until other, more pressing problems are solved first. Alternatively, perhaps homicide is considered only for a short time initially and is dismissed because an individual does not know enough about the costs and benefits to pursue a murderous strategy in earnest. In the absence of such relevant information, other, nonlethal strategies are pursued instead. Over time, however, a person may come into contact with the information that is missing, allowing for a more accurate evaluation of the adaptiveness of murder, which may trigger killing fantasies once again to re-evaluate the appropriateness of homicide as part of the solution to a particular adaptive problem or set of problems. Of course, time and uncertainty likely interact in other complex and interesting ways. More research is needed to disentangle these issues and explore the functioning of executive mechanisms in determining which problems are given primacy and the amount of cognitive resources devoted to each.

Although significant, the correlations between the frequencies of people's homicidal thoughts and how close they came to killing the person in their fantasy were small. Given the large sample size, these relationships may not be important individually. However, all of them occurred in the same direction, indicating that a reliable and potentially important effect is being represented. The macro level at which these analyses were conducted may have glossed over important differences in the contexts that triggered ideations of murder. Each context of homicide was represented to

a different extent, based on the frequency with which participants reported them. It is possible that a more fine-grained look within the specific contexts of homicide may yield stronger relationships. Future analyses will examine these relationships.

Consistent with Hypothesis 4, when men experienced a murder fantasy as a result of a sexual infidelity by their romantic partner, they reported being more likely to think of killing the rival with whom their partner was being unfaithful than their partner. Women, however, were equally likely to think of killing their romantic partner and the rival with whom their partner was having an affair, which is inconsistent with the hypothesis. There are at least two explanations for the difference in men's and women's ratings. First, there may have been selection pressures that led men to value their romantic partners more than women. Women's greater investment in reproduction makes them a limiting resource for men's reproduction (Buss, 2003; Symons, 1979). The loss of a partner may have been a greater loss for men than for women, not only in terms of women's greater investment in reproduction, but also in parenting. As a result, women may not exhibit a clear preference for targeting their partner or the rival with whom their partner is cheating. Second, the reputational damage suffered by men as a result of a partner's infidelity may have been greater than that suffered by women. To salvage their damaged reputations, it may have been more advantageous for men than for women to eliminate the cost-inflicting rival cheating with their mate. The dead rival would no longer be a threat to a man's relationship and would serve as a signal to others of the costs of poaching his mate. Third, women may have benefited equally over evolutionary history from killing their romantic partner or the intrasexual rival with whom their mate

was cheating, depending on the specific circumstances they were facing. Perhaps women would be more likely to kill their romantic partner if he had amassed resources that she could then control or that could be transferred easily to a new mate. Women might benefit more from killing their romantic partner than their rival if the women were very high in mate value, had no children, and their mate was easily replaceable. Conversely, it could be more beneficial for women to murder their rivals if their romantic partners were more irreplaceable, the women were lower in mate value, and had children with their partners. Such women would have a more difficult time replacing their mates and obtaining investment from other men. These conditions may have selected for a bias toward killing the intrasexual rival rather than the women's mates. Future research specifically on the content of murder fantasies triggered by partner infidelity will help to shed light on the present findings.

Contrary to Hypothesis 5, victims of rape experienced thoughts of killing the rapist less frequently or at a similar frequency to the boyfriends of rape victims. Rape victims also rated the likelihood of actually killing the rapist significantly lower than the boyfriends of rape victims. Although the small number of rape victims and boyfriends of rape victims in the dataset require that these results be interpreted with caution, all of the non-significant results were in the same direction as the significant results. The boyfriends of rape victims appear to be more disposed to kill rapists than are the rape victims themselves.

The failure of this hypothesis may stem from a lack of understanding of the precise costs to the secondary victims of rape relative to the primary victims. Rape

victims may not tell anyone about their ordeal as a strategy to preserve their sexual reputations (Moore, 1998). This would select against the use of homicide as a victim strategy to stanch the negative reputational consequences of their victimization. We also know from evidence of actual homicides that women sometimes do kill the men who rape them (Deweese & Parker, 2003). Taken together, the evidence suggests that the particular circumstances surrounding a rape or individual differences in women may lead some female victims to be more likely to kill than others.

Another factor that may have contributed to findings inconsistent with Hypothesis 5 is the identity of the secondary victims. All of them were young and the boyfriends of rape victims. Early adulthood is the time in the male lifespan when competition between individuals is the greatest (Daly & Wilson, 1983). The young boyfriend of a rape victim may suffer severe reputational damage because of his inability to protect his romantic partner. His mate value may also drop as a function of the decreased mate value of his partner after her victimization occurs. And he may become less attractive to his current partner because of his inability to protect her. Killing the rapist would help to ameliorate perceptions of his exploitability and send a signal to others of the costs of attacking those close to him. Finally, if the rapist represented a continuing threat to a man's romantic partner or his female kin, there would have been significant selection pressure for the elimination of the threat.

Finally, the logic of the hypothesis overlooked the significant cost asymmetry between men and women in attempting to kill a man rapist. The risks of being injured or killed are much greater for women, who are smaller and less physically formidable, on

average, than men. Those possible costs to women of murdering a rapist would be shared by her existing children and may jeopardize her future reproduction. In short, women may have less to gain and more to lose by murdering the man who raped them than their romantic partners and male kin.

Future research should examine the homicidal thoughts from a larger sample of rape victims and secondary victims, examining in greater detail individual differences in their life histories and personalities, and differences in the circumstances surrounding their victimization. The results of this research should be compared to similar investigations of rape victims and secondary victims who do kill the rapists who inflicted costs on them. The first phase of this research is currently underway in a collaboration between David Buss, Carin Perilloux, and the dissertation author. The second phase will be a part of the large-scale study of actual killers the author will begin this fall at the Florida Institute of Technology.

Male participants in the study were more likely than female participants to indicate that their partner's sexual infidelity led them to experience a homicidal thought. This is consistent with Hypothesis 6 and with research of actual homicides, which finds that men are more likely than women to kill in response to a partner's infidelity (Daly & Wilson, 1988). Men and women faced different selection pressures for the use of homicide to solve the problem of spousal infidelity over our evolutionary history. Men suffer greater reputational damage than women as a result of being made a cuckold. A powerful example from literature is Othello's lament that everyone would identify him as a cuckold,

But, alas, to make me
A fixed figure for the time of scorn
To point his slow unmoving finger at!
Shakespeare's Othello, act 4, sc. 2, l. 54-6

Men are also more physically formidable than women and would have been better able to carry out a strategy of homicide. Finally, a partner's sexual affair leads men to experience the problem of paternity uncertainty, an issue that women, who know any offspring born to them are genetic relatives, never deal with.

Consistent with Hypothesis 6, damage to sexual reputation was significantly more likely to trigger homicidal fantasies in women than in men. This finding provides evidence that the design features of men's and women's psychological mechanisms are sensitive to different components of social reputation that, when assaulted by a competitor, lead people to consider homicide. Women's sexual reputations are more directly tied than men's to long-term mate value. In mating, like violence, the best predictor of future behavior is the past (Duntley, 2005). Because men face the problem of paternity uncertainty and women do not, selection may have fashioned specialized mechanisms in men to evaluate the likelihood that they will be cuckolded by various potential mates. Women's sexual reputations may provide one source of information men use in choosing long-term mates to avoid investing in offspring that are not genetically related to them. As a result, women guard their sexual reputations more vigorously than men, sometimes entertaining thoughts of murdering attackers of their reputations as a part of a strategy of reputational defense.

Some evidence suggests that the protection of reputation is a factor that contributes to female perpetrated homicides. Campbell (1993) argues that, among female

gang members, the preservation of reputation is as important a cause of violence as being physically attacked. Female adolescents often fight with one another in defense of their sexual reputations (Lees, 1993; Marsh and Patten, 1986). Other research suggests that the preservation of sexual reputation is an important but overlooked factor in female perpetrated murders of intrasexual rivals (Kirkwood, 2003).

The finding that women's homicidal thoughts are more often triggered by a rival who damages their sexual reputation than men's is a modest first step in a series of analyses that will be conducted to investigate sex differences in assaults to status by competitors that lead to fantasies of killing. Future analyses will examine whether assaults to components of status more valued by men than women, such as intelligence, physical strength, and ability to acquire resources, will be more likely to trigger men's murder fantasies. In addition to sexual reputation, future analyses will examine whether derogation of physical attractiveness may be more likely to trigger homicidal ideation in women than in men.

The present methodology for examining people's homicidal thoughts suffers from the same weaknesses affecting its reliability and validity as the majority of survey methodologies (see Kirk, 1994). Despite these limitations, the present research on homicidal ideation generated findings consistent with previous research on the topic (Crabb, 2000; Kenrick & Sheets, 1993). Additionally, since the topic of this research is people's *thoughts* of homicide, other methodologies would not allow for such direct access to the breadth of information that a survey methodology does. The present research is valuable in demonstrating the utility of exploring the triggers and content of

people's homicidal fantasies for gaining insight into the psychological processes behind homicidal behaviors.

Future Research

One limitation of research on this topic is that the base rate of actual murders is very low relative to the prevalence and frequency of people's homicidal fantasies. This makes the content of people's thoughts of murder difficult to interpret. Do people's homicidal ideations provide a window into psychological adaptations that evolved to help individuals deal with recurrent problems specific to homicidal strategies? Or do these fantasies represent something less important, such as epiphenomenal byproducts of an imagination exposed to cultures in which murders take place? The differences in the base rates of the two phenomena may suggest that the latter option is a possibility. Future research that builds converging evidence in support of the findings presented here will help to resolve this issue.

An examination of the homicidal fantasies from people in different cultures is one important direction for future research. If people everywhere are demonstrated to engage in similar cognitive simulations of murder, triggered by the same categories of conflict with others, it would be strong evidence for universality of design in the psychological processes that underlie homicidal ideation. Such data are in the process of being collected and analyzed as part of the research program on homicide described by Buss and Duntley (under review).

Another important direction for future research involves a direct comparison of the content of people's thoughts of killing and the details of actual homicides. There

should be a particularly strong correspondence between the triggers of homicidal thoughts and the triggers of actual murders. Buss & Duntley (under review) have begun to compare the triggers of homicidal ideations in the general public to the triggers of actual homicides obtained through an examination of the case files of people accused of murder from the Center for Forensic Psychiatry in the state of Michigan. Their preliminary results indicate a high degree of correspondence between the two (Buss & Duntley, under review).

A third direction for future research involves comparing the homicidal thoughts experienced by people in the general public that are not translated into homicidal reality to the fantasies of killing entertained by people who do act on them and commit murder. As part of this comparison, psychiatric histories, presence of psychopathology, and personality differences should also be evaluated. This will help to determine the extent to which unique contexts, differences in personal histories, the presence of psychopathology, and differences in personality contribute to the suppression of mechanisms to motivate homicidal behavior in one group but not the other. Using contacts to law enforcement in the state of Florida the dissertation author will have as a faculty member at Florida Tech., he will begin conducting this research on confessed murderers in Florida in the fall semester of this year.

Another important aspect of the psychology of homicide that is untapped by the present research is psychological adaptation for warfare. The measures used in this study could be modified and administered to Veterans of Foreign Wars, active duty troops in Iraq, and in cultures with less modern warfare, such as the reciprocal patterns of raids that

occur among aboriginal groups like the Yanomamo (Chagnon, 1988). This research would allow for the identification of contexts unique to warfare that trigger killing and group processes that facilitate successful coalitional aggression.

Finally, more specific survey measures may be constructed in future research to examine finer distinctions in the triggers of homicidal ideation and people's evaluations of the costs and benefits of murder. Because questions are primarily open ended in the instrument used in the present research, it is not sensitive enough to capture many of the subtleties of participant cogitation involved in their fantasies of murder. To this end, David Buss and the dissertation author have developed and begun to administer research instruments that present participants with specific scenarios that describe significant adaptive problems involving social conflict that were likely recurrent over human evolutionary history. Participants are then asked to rate how likely they would be to use homicide and other strategies in solution to each problem. One example of the kind of distinction it is possible to make with this research is a comparison of the likelihood that men and women will kill in response to their partner's sexual infidelity, emotional infidelity, and defection from a romantic relationship.

General limitations of research on ideation

A limitation of any research that examines people's conscious thoughts is the possibility that the information of which we are consciously aware is distorted, inaccurate, or completely false. The function of conscious thought is a topic that has not been widely explored by psychologists. Some have argued that its role may be to conduct cognitive simulations of tasks before they are enacted in actual behavior

(Hameroff & Penrose, 2003; Hesslow, 2002). Others have suggested that consciousness allows humans to perform more complex calculations than would be possible if we did not possess conscious awareness (Dennett, 1991). Still others have convincingly argued that computationally complex “zombies”, those without conscious experience of the world, would be behaviorally indistinguishable from those who possess consciousness. They also point out that, to date, there is no compelling, empirically testable theory of why consciousness evolved (Flannigan & Polger, 1995).

If natural selection had a hand in shaping our conscious experience of the world, the influence of consciousness on behavior must have contributed to the reproductive success of our ancestors. To steer behavior in ancestrally adaptive directions, however, conscious experience need not be an objective, veridical representation of the world. In fact, we should expect that the influence of natural selection would create conscious states solely for their value in steering behavior in directions recurrently associated with successful fitness outcomes over our evolutionary history. Some adaptive problems would have selected for accuracy in conscious experience, others would have selected for inaccuracy. For example, research has demonstrated that men have a sexual overperception bias when inferring women’s sexual interest (Haselton, 2003). More often than not, this is a nonveridical representation of women’s actual interest. From a fitness perspective, however, it is adaptive in leading men to be more likely to capitalize on sexual opportunities when they do occur and in generating sexual opportunities that otherwise would not have existed.

In exploring data from people's homicidal ideations, it is important to bear in mind that people's interpretations of events may not be accurate. Their conscious experience of situations involving social conflict with others could be heavily laden with emotional states like fear, frustration, or rage. People's feelings of empathy may be suppressed for those with whom they are in conflict, leading them to recognize and focus only on the most negative characteristics of their competitors. These distorted states of consciousness may have been selected to facilitate the enactment of homicidal strategies.

Ideally, research should compare reports of the events that triggered murder fantasies from the people who experienced them with reports of the same events from others. This would allow for an evaluation of the accuracy of people's conscious representations of the situations that trigger fantasies of killing, as well as an opportunity to identify adaptive biases in cognition that may facilitate or inhibit homicidal behaviors that are consistent with the logic of Error Management Theory (Haselton & Buss, 2000).

Future theoretical directions

Homicide Adaptation Theory is fundamentally a coevolutionary theory of adaptations for homicide and counter-adaptations to defend against being murdered (Buss & Duntley, under review). Haldane (1949a, b; 1932) was among the first to recognize the importance of coevolutionary arms races in his discussion of the influence of infectious diseases on human evolutionary history. He pointed out that infectious pathogens possess adaptations that enable them to use human tissues to reproduce, and that we have evolved counter strategies to prevent being invaded by pathogens.

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

The fitness costs of being killed

Homicide is the elimination of another individual. Once eliminated, his or her ability to impact the future disappears. But 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: (1) the loss of future reproduction; (2) damage to existing children from lack of protection, investment, or the addition of stepparents; and (3) damage to the victim's extended kin group from diminished investment and obtaining a reputation as exploitable.

A murder victim's fitness losses can potentially be translated into a rival's 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 the influence of two genetic parents.

Homicide defenses

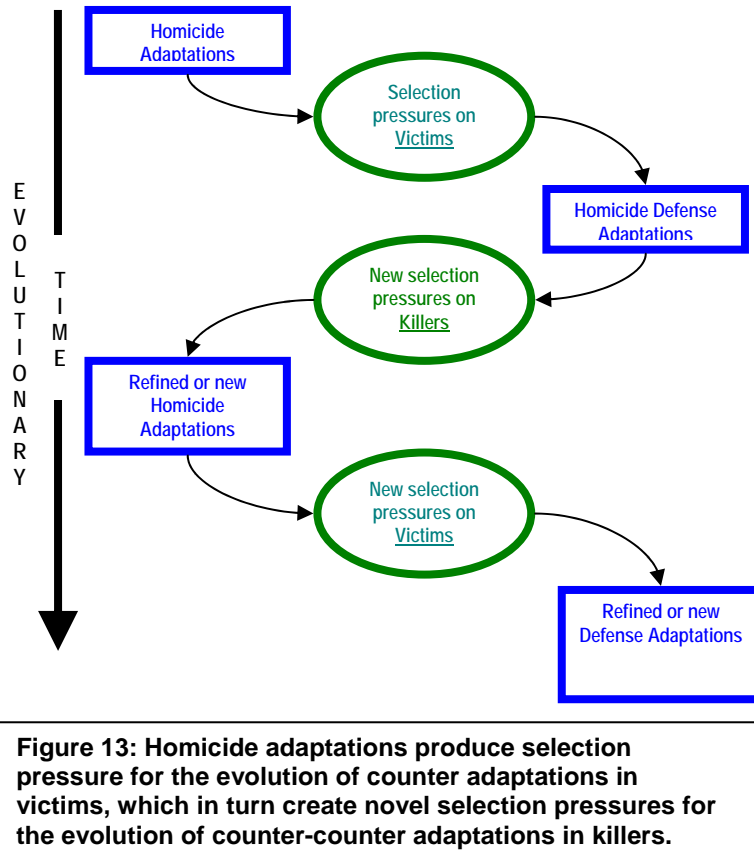
The great costs resulting from being murdered would have selected for adaptations to: (1) avoid being killed, (2) punish killers who damage one's inclusive fitness by murdering kin, mates, or coalitional allies, and (3) eliminate or otherwise render impotent individuals who presented a persistent threat of homicide to the larger social group of which an individual, his kin, and coalition are a part (e.g. psychopaths, hostile members of other groups). According to Homicide Adaptation Theory (Buss & Duntley, under review; Duntley, 2005; Duntley & Buss, 2005), inflicting costs on killers, including murdering them, is part of an evolved strategy to avoid or stanch the inclusive fitness costs of being victimized by another individual or group.

In order to avoid being killed, intended victims must be sensitive to cues indicative of situations in which someone else might want them dead. Insight into the likelihood that one will be the victim of homicide before the homicide occurs requires that murders be committed in predictable sets of circumstances. If killings recurrently occurred in response to predictable sets of circumstances over our evolutionary history, it would have selected for homicide defense mechanisms capable of recognizing those circumstances and trying to change or avoid them. The evolution of such homicide defense mechanisms, in turn, would have selected for homicide strategies that could circumvent the evolved homicide defenses. In this way, adaptations to avoid being murdered would have served as selection pressures for the refinement of psychological adaptations for homicide over evolutionary time. These new homicide adaptations would have selected for further refinements in homicide defense adaptations—homicide and

homicide defense locked in a perpetual, antagonistic, coevolutionary arms race across generations, as illustrated in Figure 13.

Demonstration of the existence of a psychology of homicide defense that appears to have been designed to defeat specific homicidal strategies would provide evidence that: (1) homicide was likely a recurrent feature of ancestral environments, (2) homicidal strategies occurred in predictable patterns over our evolutionary history, and therefore (3) there may be adaptations specifically for homicide. The greater the corresponding specificity of design in the psychologies of homicide and homicide defense, the stronger the evidence that the two have had a co-evolutionary relationship, and the greater the support for the existence of adaptations for homicide.

Figure 13: Antagonistic coevolution of homicide adaptations and homicide defense adaptations.



There are no perfect solutions to any adaptive problem. Every adaptation is a compromise between the different adaptive problems an organism faces. At the same time an individual selection pressure operates to shape or 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 other adaptive problems of survival and reproduction that individuals must solve, for perfect adaptive solutions to

evolve. Therefore, it is unlikely that adaptations for murder and adaptations to defend against being killed will lead to the outcomes for which they were designed on every occasion. For selection to favor them, they need only lead to greater reproductive success than competing designs *on average* across the individuals in a population over evolutionary time.

Co-evolutionary 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 is also selection pressure on the woman to obtain better or different genes than those possessed by her husband or acquire additional investment from another man. Female adaptations to engage in infidelity in some contexts would select for male adaptations to stanch women's infidelious dispositions, especially when a man and woman are in a long-term mating relationship. One hypothesized male adaptation to deal with infidelity is homicide.

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 aid women in being unfaithful. These male adaptations that promote female infidelity would, in turn, create selection pressure on men's long-term mating psychology for adaptations to prevent other men from poaching away their long-term partners, including killing the mate poacher, a cheating 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 14. The evolved psychological mechanisms that evolve in a given individual impose new selection pressures on both of the other individuals in the triadic relationship. Male homicide adaptations to deal with a partner’s infidelity, for example, would select for homicide defense adaptations in both romantic partners and poachers. One possible evolved defense against being killed is to murder the intended killer. This would select for homicide defense adaptations in killers. These homicide defense adaptations are hypothesized to feed their evaluations into the cost-benefit matrix of psychological mechanisms responsible for motivating or inhibiting murderous patterns of behavior in men who discover their partners have been unfaithful.

Figure 14: Triadic antagonistic coevolution

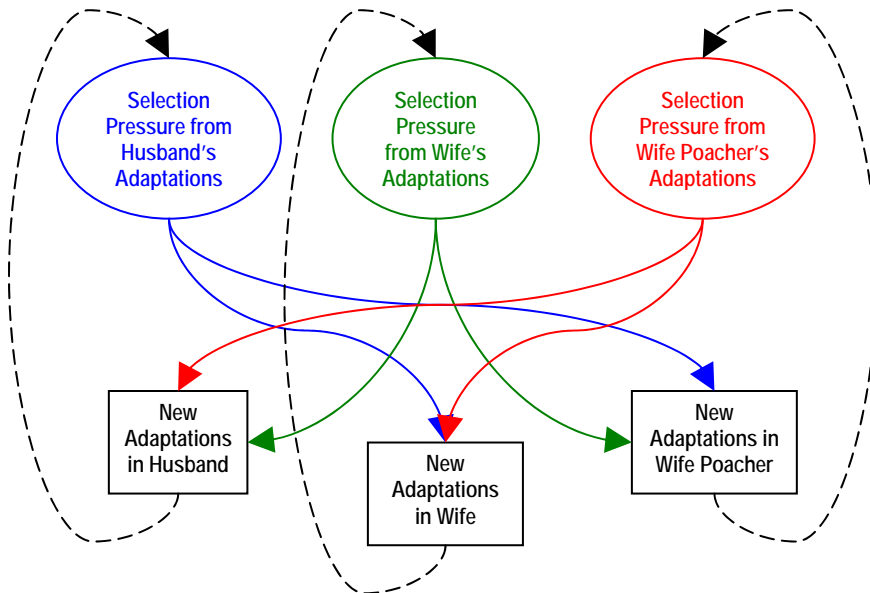


Figure 14: When three individuals have conflicting interests in the same adaptive problem domain, an adaptation in one individual can simultaneously create selection pressure on two (or more) other individuals. The counter adaptations that evolve in each of the two other individuals as a result can then 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.

The probable coevolutionary history of adaptations for homicide and counter adaptations to defend against being killed suggests that a profitable research direction would be to explore people's thoughts that someone else wanted to kill them. In collaboration with David Buss, I have begun conducting research on people's homicide defense ideations. Future work will examine the specificity of correspondence between the content of people's murder fantasies and their thoughts that others might want to kill them.

The importance of time and opportunity

Time was likely an important and potentially powerful selection pressure on the psychology of homicide. Time could have been an important selection pressure in at least two ways. First, the time available to solve a problem may increase or decrease the likelihood with which homicide will be chosen as its 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. The interaction of time with adaptive problems and solutions would have created selection pressure for psychological mechanisms capable of calculating the amount of time available to solve a given problem. Estimates of the amount of time available would have been a source of input for making decisions about which adaptive solution should be employed.

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 provided selection pressure for the adoption of the only strategy guaranteed to put an absolute end to conflict between the two individuals – murder. Examples may include homicides that are committed in self-defense. A woman who is cornered in the kitchen by her abusive husband may instinctively reach for a knife to defend her life by ending his. In such situations, homicide may not be the most beneficial possible solution to the problem, but it is the least costly of available alternatives.

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 homicidal strategies. 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 opportunity. 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 homicide to exploit rare contexts such as this.

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

A second way that time could have been an important selection pressure for the evolution of homicide adaptations rests on the importance of responding to costly assaults from others in a timely fashion. Most people are familiar with the proverb, “Revenge is a dish best served cold,” which suggests that emotional detachment and planning are best for taking revenge. This may be true for the optimal planning of strategies of revenge. However, there are clear time limits on the effectiveness of strategies for seeking

revenge, including homicide. Waiting too long to avenge being wronged 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 creating a larger window for exploitation to occur. Although revenge may be a dish that is best served cold, reputation may an asset that is best defended by striking while the iron is hot. Killing the individual who is the source of reputational damage is one effective strategy for the defense of reputation (Buss; 2005; Chagnon, 1988). Murder eliminates the person's ability to inflict costs in the future and clearly signals other rivals the price they will pay for similar assaults.

The timing of homicide relative to other, complementary strategies is also likely to have been an important source of selection pressure on the function of mechanisms for murder. Adaptations for homicide are likely comprised of a suite of mechanisms designed not only to produce homicidal behavior, but also to deal with the probable consequences of killing someone. Murder as the solution to a primary adaptive problem is likely to create secondary problems, such as retribution from the genetic relatives of the victim. 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 murderer could take steps to cover up the crime or hide the body, avoid the genetic relatives of the victim, threaten to kill them, or actually kill them if they attempt to retaliate, or marshal a formidable coalition to help make the costs of avenging the victim's death too high to be adaptive. Other secondary solutions may be more appropriately adopted before the primary solution (homicide) takes place. For example,

an individual who may, in the future, adopt a strategy that includes murder could try to impugn the status and reputation of the person they intend to kill. An intended killer might also attempt to drive wedges between the would-be victim and the kin and coalitional allies who would pose the greatest threat of avenging the victim's death, thus eliminating or decreasing the magnitude of secondary problems that will likely result from the murder. These ideas are illustrated in Figure 15. Interestingly, adaptations for homicide could use information about the effectiveness of secondary solutions employed in anticipation of the secondary problems murder will create as a source of input for the cost-benefit calculus that determines whether to kill the intended victim or do something else. In addition, if secondary solutions employed before homicide in particular contexts were recurrent over evolutionary time, selection should have operated on homicide defense adaptations to recognize the secondary solutions and motivate people to take action to prevent an attempt on their life from occurring.

Figure 15: Homicide as the solution to an adaptive problem can create secondary problems that require solution

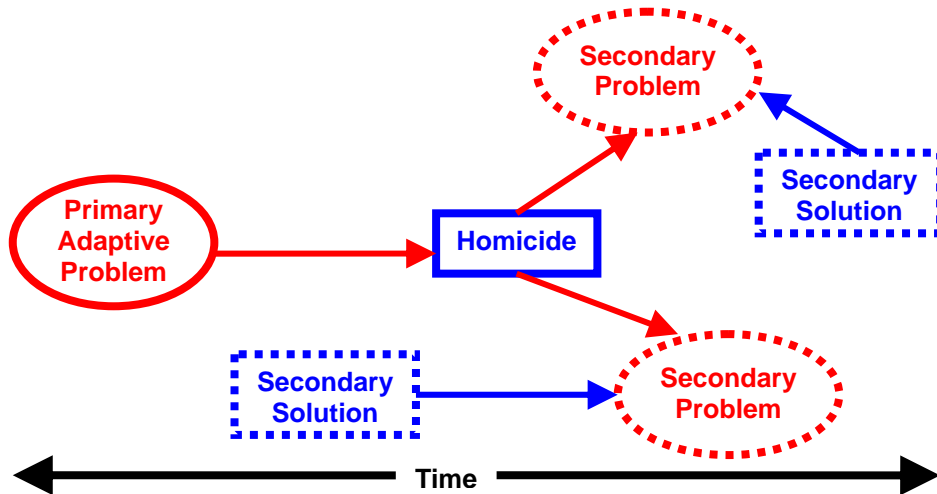


Figure 15: The use of homicide to help solve an adaptive problem can create secondary problems, such as retribution from the kin of the victim. Selection would have operated on the mind to anticipate likely problems resultant from murder and shaped a menu of possible solutions. Solutions to secondary problems created by murder could be enacted a before, during, or after the killing.

Implications of adaptationist research on the psychology of homicide

There is great promise in applying the adaptationist approach that guided the present research to other cognitive and behavioral phenomena. Evolutionary theory provides a powerful set of tools to explore 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). In collaboration with David Buss, the dissertation author has used the same logical framework to explore the psychology of stalkers and their victims.

If it turns out that cognitive mechanisms for murder are biologically engrained in the human psyche, it does not mean that we should be more tolerant of homicide 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). The existence of adaptations for homicide also does not mean that homicide is inevitable. The present research demonstrates that the majority of murder fantasies are not translated into homicidal reality. Jones (1997) argues that our system of laws is designed to act as a lever to move behavior in desired directions. As the present research suggests, the costs of being punished by the police significantly inhibit homicidal behavior. By gaining a better understanding of how our psychology for murder functions, we may be able to create more effective legal interventions to prevent killings from occurring. Even if the application of evolutionary logic to help understand phenomena like homicide and stalking turns out to be misguided, the research findings produced still represent a valuable contribution to our understanding of the phenomena. This knowledge could potentially be used both to prevent some murders and episodes of stalking from occurring and to help the families of murder victims and those being pursued by a stalker. One practical application of the research David Buss and the dissertation author have conducted on stalking is an informational website for victims, www.stalkinghelp.org. We use our research findings and those of others in the field to give victims insight into the psychology of stalking so that they can better anticipate and react to the tactics commonly employed by stalkers.

In conclusion, it is clear that homicidal ideations are a pervasive part of human experience. The majority of both men and women report having at least one homicidal thought in their lifetime. The present research took a first step in exploring the triggers and content of people's fantasies of murder. The findings, most of which were predicted in advance, demonstrate clear patterns in men's and women's homicidal fantasies. None of the topics explored in this research would have been examined without the specific guidance provided by Homicide Adaptation Theory. Other theories of killing have difficulty accounting for the sum of the results presented. The contribution made by this research is a modest first step in what promises to be an interesting and valuable exploration of the psychology of murder. The adaptationist perspective that is the theoretical foundation of the present research has great potential to suggest exciting, new research directions that transcend specific problem domains, such as adaptive biases in conscious experience, the psychological consequences of antagonistic coevolutionary arms races, and the impact of time on the strategies we pursue. Although this research will not bring an end to all homicide, it is a positive step toward understanding the psychological processes that lead people to kill. Armed with this knowledge and the results of future research, there is hope that constructive changes in laws and public policy can be undertaken to minimize the number of murders that occur.

APPENDIX A

Research has shown that many normal people occasionally have thoughts about homicide. We think that some situations more than others cause people to think about killing someone else. This survey was designed to examine your thoughts about these situations.

This is extremely important research. Please be thoughtful and honest when responding to each item. Thank you for your help.

1. What is your current age? _____ *age in years.*
2. What is your sex? Male Female (*circle one*)
3. Think carefully about all of the experiences in your life for a few moments... Have you ever thought about killing someone else, even for just a moment?

Yes No (*circle one*)
4. About how many different people have you thought of killing in your entire life?
_____ *number of different people.*
5. About how old were you when you had your first thought of killing another person?
_____ *age in years.*
6. About how many times have you had thoughts of killing another person in your entire life?
_____ *total number of times.*

Some of your thoughts about killing someone else may have been more vivid (detailed, intense) or memorable than others. Think of the most vivid or memorable thought about killing someone else you ever had.

In this thought, (*Please only include information that was part of your original thought.*)

7. Who did you think about killing? _____
8. How did you know this person? _____
9. What was their relationship to you? _____
10. If this person is a relative of yours, how are they related to you? *Please differentiate between parents and step-parents; full siblings, half siblings, and step-siblings, etc.*

11. What was the sex of this person? Male Female Unknown N/A (*circle one*)
12. What was the person's age at the time you first had the thought?

_____ *age in years.*

13. Did you ever live with this person? Yes No (*circle one*)

14. If yes, how long did you live with the person?

_____ *amount of time in months.*

15. What was your age the first time you had the thought?

_____ *your age in years.*

16. What else should we know about this person?

17. Please describe, step by step, what happened that caused you to think about killing this person. ***Please write two or three paragraphs and give a complete description.***

18. Please describe, step by step, how you thought you would kill the person. ***Please be as detailed and specific as possible.***

19. Please describe any changes in your behavior or anything you did that you otherwise would not have done that was the result of having this thought. ***Please be as detailed and specific as possible.***

Please answer the following questions about your thought. If any of the following items do not apply to your thought, please respond with N/A.

20. Where did you think about killing the person?

21. What method did you think about using to kill the person?

22. What prevented you from actually killing the person? *Please be as detailed and specific as possible.*

23. What could have pushed you over the edge and led you to actually kill the person? *Please be as detailed and specific as possible.*

24. Over what time span (from the first time you had the thought until the last time you had the thought) did this thought appear in your mind?

_____ *amount of time in days.*

25. During the period when you were actively having the thought of killing the person, how often did you have the thought each day?

_____ *number of times per day.*

26. When you had this thought, how long did it usually last?

_____ *amount of time in minutes.*

27. How close did you come to actually killing the person? *Use the chart below to assign a percentage to your rating.*

-|- 100% I did kill the person.

-|- 90%

- | 80% I came extremely close to killing the person.
- | 70%
- | 60% I came very close to killing the person.
- | 50%
- | 40% I came quite close to killing the person.
- | 30%
- | 20% I came somewhat close to killing the person.
- | 10%
- | 0% I never thought that I would actually kill the person.

28. If you knew that you would not be punished by anyone at any time for killing the person, what is the likelihood that you actually would have killed the person? *Use the chart below to assign a percentage to your rating.*

- | 100% I definitely would have killed them
- | 90%
- | 80% There is a very strong chance that I would have killed them
- | 70%
- | 60% I probably would have killed them
- | 50%
- | 40% I might have killed them
- | 30%
- | 20% There is a slight chance that I would have killed them
- | 10%
- | 0% I definitely would not have killed them

29. If you knew for certain that the family and kin of the person would not come after you in any way, what is the likelihood that you actually would have killed the person? *Use the chart below to assign a percentage to your rating.*

- | 100% I definitely would have killed them
- | 90%
- | 80% There is a very strong chance that I would have killed them
- | 70%
- | 60% I probably would have killed them
- | 50%
- | 40% I might have killed them
- | 30%
- | 20% There is a slight chance that I would have killed them
- | 10%
- | 0% I definitely would not have killed them

30. Did you think about doing anything else to the person in response to the events that led you to think of killing them?

Yes No N/A *(circle one)*

31. What did you think about doing? *Please be as detailed and specific as possible.*

32. What did you actually do in response to the events that led you to think about killing the person? ***Please be as detailed and specific as possible.***

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