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## THE EVOLUTIONARY PSYCHOLOGY OF HOMICIDE

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Every year, tens of thousands of people are murdered in private conflicts outside the context of war. Barroom contests of masculine honour escalate to lethality, women are slain by scorned husbands and lovers, and children are fatally assaulted by angry caretakers. How are we to understand why conflicts of interest and the passions they engender are occasionally so intense as to motivate these homicides?

A satisfactory approach to this question would seem to require an understanding of what interpersonal conflicts of interest are fundamentally about, and such an understanding must itself be predicated on a basic theory of the sources and substance of individual self-interests. There is both good news and bad news on this intellectual front. The good news is that scientists have been developing, testing, and refining the requisite body of theory for decades, with the result that it is now sufficiently complex, non-intuitive, and well verified to be of real value to criminologists and other social scientists. The bad news is that few social scientists are aware of these developments because they have taken place in the *terra incognita* of evolutionary biology and ethology.

### **An Evolutionary Adaptationist Approach to Psychology**

The evolutionary view is that perceptions of self-interest must be understood as mediators of the pursuit of genetic posterity or "fitness" in ancestral environments. The phrase "perceptions of self-interest" should be interpreted broadly. Immune systems and cell membranes, for example, operate outside our awareness but they participate in perceiving and defending our interests nonetheless.

In this view, it is often useful to analyze organisms into their constituent "adaptations": evolved components with specific functions. A human being is a complex integrated system comprising countless complexly functional subsystems, some accessible to awareness, others not. Distinct tasks such as respiration, learning, digestion, visual scene analysis, killing parasitic microorganisms, and so forth are carried out by distinct bits of anatomical, biochemical and psychological machinery, in the service of a functionally integrated, higher-order, organismic agenda. And what is that agenda? In a nutshell, all these subroutines evolved to contribute to the single end of manufacturing additional, similar people. Success in doing so was the sole criterion by which Darwin's demon, natural selection, accumulated all that complex functionality. Selection

is the differential reproductive success of alternative phenotypic designs, within populations and within each sex. What selection favours is any attribute that enables individuals to outreproduce same-sex conspecifics.

Adaptationist thinking is a ubiquitous and inescapable element of all life sciences. Assumptions and hypotheses about adaptive function pervade psychology, for example, for the same reason that they pervade physiology: because the mechanisms under study are obviously organized in such a way as to achieve something. All psychological investigation is guided by conceptions of what that "something" might be, whether "signal detection" or "social comparison" or the reduction of "frustration" or the maintenance of "self-esteem". Unfortunately, adaptationist thinking in psychology has often been naive because of failures to make use of contemporary understandings of evolution by selection, the process that creates adaptations. Had Freud better understood Darwin, for example, the world might have been spared such fantastic dead-end notions as "death instincts" and "Oedipal" desires.

Psychologists have long been aware of hierarchies of function. Lateral inhibition in the retina, for example, is interpreted as a means to the end of edge detection, which is a means to the end of object recognition, which is a means to the ends of foraging and predator avoidance, which are means to the ends of energy accrual and survival. But psychologists have wandered down innumerable garden paths by imagining that the summit to this hierarchy of functions -- the end to which all of the organism's immediate objectives are subsidiary -- is homeostatic quietude, or personal growth, or longevity, or "the reproduction of the species", or even death. What people and other organisms are organized to achieve is of course none of these. It is Darwinian fitness.

In general, then, our human appetites and aversions have evolved to motivate behavioural choices with the best expected fitness consequences in ancestral environments. Sweet tastes acquired their appeal because they were useful indicators of the presence of valuable nutrients. Infidelity of one's mate is aversive because of the threats to fitness that it has entailed. We stress "ancestral environments" because the human animal's evolved psychology and physiology are historical artifacts, designed by a natural selective process that requires persistent relationships between cue and consequence over many generations. When environments change rapidly, evolved psychological mechanisms will not necessarily promote fitness, even on average. Mechanisms whose function is the detection of nutrients can be deceived by evolutionarily novel substances like saccharine. Mechanisms whose function is the assessment of a potential mate's fertility can be deceived by evolutionarily novel cosmetic interventions. This is not to say that an evolved psyche is a simple stimulus-response machine without flexibility, but simply that fitness *per se* is clearly not a goal, nor could it ever be. The statistical contingencies of the past are the only information that selection has had to work with. In what follows, we won't repeat the phrase "ancestral environments" *ad nauseum*, but it should be taken as given whenever we refer to expected fitness effects.

It is easy to attribute psychophysiological phenomena like sweetness detection to evolution by selection, and easy to grant selection's relevance to basic preferences such as aversion to pain. Where many balk is at the notion that selection has also imparted complex structure to the seemingly more voluntary and rational processes by which we choose and execute the means to gain our ends. But introspection and folk psychology can be misleading in these matters, and a

more subtle evolutionary psychological conception would better reflect the diversity of processes that actually mediate "choice" among behavioural alternatives.

Evolutionists routinely model the costs and benefits of alternative "decision rules" about such matters as how many eggs a bird should lay before incubating them and rearing the chicks, or when a plant should stop channeling all its accrued energy into further growth and start putting some into reproduction. These determinations are aptly termed "decisions" insofar as they are complexly contingent on environmentally given information that imperfectly but usefully predicts relevant future conditions.

To everyday folk psychology, this is mere metaphor, and perhaps a rather stretched metaphor at that. Genuine decisions are surely the products of deliberation by conscious human beings. Unfortunately for this folk conception, however, experimental psychologists have demonstrated repeatedly that people do not necessarily enjoy privileged insight into the determinants of their own decisions, and that the phenomenology of deliberation and reasoned choice can be illusory and reconstructive. Psychology experiments in which causal determinants of choice have been controlled by the experimenter elicit explanations from observers and from the decision-makers themselves that are coherent and plausible but demonstrably incorrect. For example, people might give an elaborate explanation for why they liked one film sequence more than another, when in fact their preferences were best accounted for by white noise levels manipulated by the experimenter. And this retrospective "theorizing" doesn't just lead us to misperceive the reasons for our actions, but also to misrecall our pasts, sometimes dramatically.

The implication of these findings is certainly not that human decision-making and the inferential procedures that inform it are inept, as has sometimes been implied. Our inference and choice procedures apparently deal with naturalistic inputs very well. Rather, the point we mean to stress is that neither decision processes themselves nor their logic and functionality are necessarily transparent to introspection. A great deal of inaccessible information processing by complex evolved machinery, designed by selection specifically to make such decisions, is involved.

This complex evolved machinery includes the emotions, and one of the most mischievous false dichotomies in folk psychology is surely that of reason versus emotion. Emotional states are functional operating modes whose specific elements are design features facilitating effective response to the situations that arouse them. A maxim like "don't get mad, get even" is therefore grounded in confusion: "getting mad" evolved as a means to the end of getting even. If it were generally (or on average) the case that fear, anger, jealousy and other emotional states interfered with our capacities to make decisions that furthered our interests, then we would have evolved to be affectless zombies. The very fact that we have not is testimony to the functionality of emotional states, as is the incapacity of people whose emotional mechanisms are operating abnormally.

Once the complexity of the psychological machinery generating even our "rational" choices is acknowledged, it no longer seems odd to speak of a physiological decision about when to ovulate, or to refer to choice points in growth and development, using the same language that we apply to the process that selects among behavioural options. In all these cases, some elaborate and only partially understood procedure, involving evolved information-processing machinery, the residua of individual experience, and contemporary extrinsic inputs, generates one choice rather than

another. And if the deliberative homunculus of folk psychology seems not to be involved in deciding how much you will let your bone calcium be depleted during lactation, well, he contributes nothing towards a genuine explanation of how you decide what to eat or what to wear, either.

### **Homicide as a "Conflict Assay"**

The postulate that expected fitness is the bedrock of self-interest entails an implicit theory about where interests intersect and where they diverge. Two creatures have consonant interests to the degree that the exigencies that would enhance one party's expected fitness would enhance the other's, too, and we might expect that the two will generally perceive their interests as harmonious in such a case. Each should be happy to let the other pursue his or her interests unobstructed. An example is the case of monogamous mates with shared interests in several joint offspring. Conversely, two creatures are likely to perceive their interests as discordant, and hence to experience conflict, to the degree that the exigencies that raise one's expected fitness diminish the other's. Each party suffers when the other actively promotes its self-interest, and inclinations to thwart one another are likely. An example is the case of rivals for the same mate.

Clearly, where interpersonal violence is a response to apprehended conflict, this conceptual framework has implications about who is likely to use violence against whom, and about the circumstances that will exacerbate or mitigate the risk of violence in particular relationship categories. That has been the unifying idea behind our evolutionary psychological approach to the epidemiology of homicide.

Homicides provide a particularly valuable window on the psychology of interpersonal conflict. Whereas the validity of most social scientific means of measuring antagonism, hostility and violence must be suspect, lethal assault is drastic action. Moreover, because the bodies are usually found and the circumstances at least minimally investigated, a sample of homicide cases does not suffer from the biased detection and/or reportage that plagues records of lesser manifestations of genuine conflict. Any theory of the nature of human conflict ought to shed some light on who is likely to kill whom, when, why, and under what circumstances.

It must be emphasized that studying homicide as a sort of "assay" of the evolved psychology of interpersonal conflict does not presuppose that killing itself has been favoured by selection and is something that the human psyche is specifically adapted for. It might be the case that some parts of our human nature have been shaped by selection to deal specifically with lethal intraspecific conflict, or it might not. It's an interesting question, perhaps, but it is not the issue that we are concerned with here. In any case, homicide may be viewed as an unusually extreme manifestation of conflicts that are usually nonlethal. Factors which exacerbate or mitigate conflict may be expected to raise or lower the likelihood of homicide, regardless of whether homicide is self-interested action or an over-reactive "mistake" with negative consequences for the perpetrator. Insofar as killings represent the extreme tail of a distribution -- rare products of psychological processes and behaviour whose more usual, nonlethal manifestations have useful effects like successful resource expropriation, deterrence of infidelity, coercion and intimidation -- then factors that influence the likelihood of violence in the pursuit of these valuable social outcomes may be expected to affect the risk of homicide, too.

## Evolved Nepotism and Family Violence

Before Darwin, the adaptive complexity of living creatures could only be interpreted as reflections of the incomprehensible aesthetic preferences of one or more creators. Darwin radically reinterpreted biological adaptations as components of "reproductive strategies", a view that met no substantive challenge for more than a hundred years. Then, in 1964, the British theoretical biologist W.D. Hamilton pointed out that personal reproductive success is not really the fundamental criterion of success or failure in the evolutionary sweepstakes. The more basic criterion is one's impact on the replicative success of one's phenotypic and genotypic elements, whether in descendants or not.

Any one of Queen Elizabeth's genes has a 50% chance of having a descendant copy in her daughter Anne. It also has a 50% chance of being represented in the queen's sister Margaret by virtue of descent from the same parental gene. Anne and Margaret are equally related to Elizabeth, and equally likely to share any of her heritable traits. Any child of Margaret's would provide exactly the same expected contribution to Elizabeth's long-term genetic posterity as would a child of Anne's. Hence, it is at least possible for selection to favour sororal as well as maternal beneficence. Whether it will do so in any given species depends on its ecology and on the expected impacts of alternative ways of allocating one's efforts.

Hamilton's "inclusive fitness" theory formalized and generalized this "nepotistic" logic, providing the single most important stimulus to recent theory and research on social evolution. By extending the concept of fitness to include the actor's effects on the expected reproduction of collateral as well as descendant kin, Hamilton solved the problem of accounting for the evolution of altruistic actions that reduce the actor's expected reproductive success while enhancing someone else's. Inclusive fitness theory has replaced the classical Darwinian conception of organisms as evolved "reproductive strategists" with the notion that they have evolved to be "nepotistic strategists".

One implication of Hamilton's theory is that any socially complex species is likely to possess psychological adaptations tending to soften potentially costly conflicts among genetic relatives. If my rival in a contest for a limited resource is my brother, for example, it makes less difference to my fitness who wins than if the rival were unrelated, so the benefit of victory is diminished. Moreover, the cost of using dangerous competitive tactics is higher in the case of fraternal rivalry since injury to either party damages the fitness of both. A large body of research on nonhuman animals has confirmed the expectation that evolved social psychologies will respond to cues indicative of close kinship by turning down the heat of conflict.

There is no obvious reason why human beings should be an exception, and yet that is what our species would seem to be when one reads media reports and the professional literature on family violence. There, it would appear that rather than being relatively subdued, violent conflicts with kin are the norm. According to Richard Gelles and Murray Straus, probably the best known and most widely consulted experts on family violence in America, for example, "the family is the most frequent single locus of all types of violence ranging from slaps, to beatings, to torture, to murder... [violence] is at least as typical of family relations as is love". We began our studies of human

violence in the late 1970s, and as animal behaviourists and evolutionists, we found such claims astonishing. Could the human animal really be so exceptional as to be exempt from the principle of Hamiltonian nepotism? Could it actually be the case that kinship exacerbates violent conflict in this one remarkable species? These things seemed unlikely, and our initial skepticism has proven to be well founded.

In those days, criminologists routinely categorized relationships into just three categories: "strangers" versus "acquaintances" versus "relatives" (or an even broader third category of "intimates"). We thought it important to make some further distinctions. We began our homicide research in Detroit, an American city with three advantages for our purposes: it was handy to our Canadian home, the police department was exceptionally receptive to research, and there were more homicides in Detroit in a given year than in all of Canada.

So we constructed a data archive from Detroit police records, and we were soon convinced that lethal violence in the United States is not such a family affair after all. Only a quarter of the victims of solved homicides had been slain by "relatives", and the relatives in question were overwhelmingly spouses. Step and in-law relationships were also frequent. The upshot was that victim and killer were genetic relatives in just 6% of the solved cases (and almost certainly in even fewer of those remaining unsolved). Subsequent research has indicated that these proportions are fairly typical of homicide in the United States as a whole.

This 6% figure is not particularly meaningful, except as a corrective to common misperceptions. Where the homicide rate is lower, the proportion of solved cases in which victim and killer are blood kin tends to be higher. In Britain in recent decades, for example, our analyses of Home Office data indicate that the corresponding figure is 16%. (We should probably explain that this does not mean that the British are likelier to kill their kin than are Americans. Detroiters in fact killed blood kin at a per capita rate 12 times higher than did contemporary Britons, but they killed nonrelatives at a phenomenal 40 times higher rate than the British, so the kin cases are proportionately fewer. We'll get back to the issue of why there is such dramatic cross-national variability in homicide.)

These numbers in themselves neither support nor refute the idea that the human social psyche is functionally nepotistic. People indeed kill relatives, and in certain societies, such cases can constitute a substantial proportion of all killings. But substantial compared to what? The notion of nepotistic restraint in the use of violence is implicitly relative, and the question is whether kinship mitigates the risk of violent conflict when other things are equal. But of course other things never are equal, and it is difficult to say what fraction of homicides we should expect to be intrafamilial if kinship were irrelevant, as criminological theory implicitly assumed.

Actually, mainstream criminology has had virtually nothing to say about kinship. The only theoretical approach that seemed to us to be of any relevance to the question of the expected distribution of victim-killer relationships was the prevalent model of opportunity in relation to "routine activities". According to an expert witness addressing the question "Why do intimates commit violence against one another?" before a U.S. presidential commission on the causes and prevention of violence, for example, "Perhaps the most powerful if crude answer is because they are there... It cannot be surprising that more violence is directed against those with whom we are in

more intimate contact. We are all within easy striking distance of our friends and spouses, for a goodly part of the time."

Some of the best criminological research was (and still is) being conducted in a routine-activities framework, so this aDarwinian opportunity model deserved a serious test. But the problem of estimating a potential killer's access to potential victims in various relationship categories is formidable. One approach is to confine analysis to a tractable limited domain, such as those cases in which the two parties were members of the same household. Information on the living arrangements of the population-at-large can then be used to specify the universe of potential victim-killer pairs, and relationship-specific rates can be computed. We were able to perform such an analysis of the Detroit homicides, and we found that genetically unrelated people who lived in the same household experienced a homicide rate more than eleven times greater than did coresiding blood kin.

This much greater level of violence was just as true of unrelated roommates and boarders as it was true of marriage partners. Thus, our emphasis on the relative rarity of lethal violence among blood kin is not easily dismissed as a convoluted way of referring to some special capacity for violence in marital relationships. Another noteworthy point is that although our statistical analysis conflated step- and in-law relationships with genetic relationships (because population-at-large data were inadequate for making these distinctions), stepfathers were implicated in fully half of the cases in which children were killed by "parents". In general, then, the facts about homicide in Detroit are inconsistent with a simple opportunity model, but fully consistent with the Hamiltonian proposition that genetic relationship is associated with a reduction in conflict and violence. There is no reason to believe that Detroit is unusual in this regard. (Actually, the expert quoted above went on to propose that intimates must be the victims of an even larger share of violence than simple access would predict, because a more satisfactory opportunity model would incorporate the intensity as well as the frequency of interaction. But this more complicated opportunity model is even further from the facts.)

Other sorts of analyses also support the view that kinship matters for reasons that cannot be reduced to mere opportunity. Consider the distinction between collaborators and antagonists. Opportunity variables such as the frequency and intimacy of interactions should affect cooperative and conflictual interactions in parallel. If relationship distributions in homicide cases were due merely to opportunity, then, we might expect that the distribution of relationships between persons collaborating in a homicide should be similar to the distribution of relationships between victims and their killers. We have compared these distributions in every relevant data set we have been able to lay our hands on, including anthropological and historical materials from a wide range of societies, and the results are always essentially the same. Close genetic relationships are far more prevalent among collaborators in violence than among victim and killer, everywhere, and the reverse is true about in-laws. Even in patrilineal social systems in which brothers are one another's principal rivals for familial lands and titles, there is evidence that close genealogical relationship softens otherwise equivalent conflicts and reduces the incidence of violence.

The largest data set bearing on this issue is a British one, but it is not the Home Office's contemporary homicide archive. The homicide rate in 13th century England was similar to that prevailing in American urban ghettos today. Norman justice was such that there were strong

incentives to divulge killings to the traveling justices, so it is likely that the judicial proceedings in eyre captured a large proportion of all cases. These rolls survive in the Public Record Office in London, and the historian James Given has assembled a superb archive of several thousand cases from them. A peculiarity of 13th century homicide in England was that two or more people were identified as co-offenders in more than a third of all cases, affording a very large sample for comparison with the distribution of victim-killer relationships. As we expected, the two distributions are radically different: 15.2 % of co-offender pairs were genetic relatives compared to just 2.3 % of victim-killer relationships. In-laws, by contrast, constituted more than twice as large a proportion of victim-killer pairs than of co-killers. A 13th-century Englishman was far less likely to kill his brother than to collaborate with that brother in murdering a nonrelative, but the same could not be said about his brother-in-law.

We have discussed "opportunity" models as if they were alternatives to Hamiltonian nepotism, but they need not be. Kinship cannot be apprehended magically; nepotistic allocations of benefits depend on cues of kinship, and those cues might in principal be the very ones invoked as determinants of behaviour in an opportunity model. Many animals indeed "recognize" their kin on the basis of "mere exposure", for example, but that usually means exposure at a very specific life stage. If one's nestmates are reliably one's siblings in a given species, then one may learn the individual identities of putative siblings in infancy, and then continue to treat such early nestmates preferentially throughout life, even if some rare mishap has uncoupled genetic relatedness from infantile familiarity. But mere exposure at any and all life stages is unlikely to be an even remotely reliable cue of kinship, and it is certainly not the basis of human cooperativeness and conflict. The Detroit data, the 13th century English data, and many other analyses are unanimous in this implication: Familial solidarity in *Homo sapiens* cannot be reduced to a mere consequence of proximity and familiarity.

### **The Truth about Cinderella**

Parental efforts and investments are valuable resources, and selection favours those parental psyches that allocate effort effectively to promote fitness. The adaptive problems that challenge parental decision-making include both the accurate identification of one's offspring and the allocation of one's resources among them with sensitivity to their needs and abilities to convert parental investment into fitness increments. A mistake in identification can obviously incur a huge natural selective penalty, and countless animals have been found to be sensitive to species-appropriate cues that help parents avoid squandering resources on nonrelatives. Nevertheless, parents can be deceived, especially since selection is also acting on those unrelated usurpers to evolve means of bypassing parental defences. Bramblings and pipits have evolved to detect and reject other species' eggs in their nests, for example, but the two lineages of cuckoos that parasitize them have responded evolutionarily with eggs that mimic those of their respective hosts.

More puzzling than such deception are instances in which adults who have access to reliable cues of nonparenthood take on parental duties nonetheless. In the animal kingdom, this happens mainly after forming a new mateship with someone who already has dependent young. In many species, such young are likely to be killed, but in species in which the single parent has some leverage, the replacement mate may assume the role of stepparent, with varying degrees of effort and enthusiasm. And *Homo sapiens* is clearly such a species: new mates make pseudoparental

investments in their predecessors' children as part of the reciprocal exchange involved in courting and establishing a relationship with the widowed or divorced parent.

Human stepparents invest considerable effort and may even come to love their wards. But it would be surprising if the psychology of genetic parenthood were fully engaged, with full commitment, in this situation. It is adaptive and normal for genetic parents to accept nontrivial risks to their own lives in caring for their young, but selection presumably favors much lower thresholds of tolerable cost in stepparenting. Stepchildren are seldom or never so valuable to one's expected fitness as one's own offspring would be, and those parental psyches that are easily parasitized by just any appealing youngster must always have incurred a selective disadvantage. Little wonder, then, that the exploitation and mistreatment of stepchildren is a thematic staple of folk tales all around the world. And little wonder, too, that stepparental obligation demonstrably enters into remarriage decisions as a cost, not a benefit, with dependent children from past unions both detracting from the single parent's marriage market value and raising the chance that the remarriage will fail.

In light of these considerations, one might suppose that child abuse researchers needed no evolutionary perspective to wonder about the factual basis of Cinderella stories. Are parents really more likely to neglect, assault, exploit and otherwise mistreat their stepchildren than their genetic children, and if so, just how important a risk factor is this? Surprisingly, however, in the explosion of child abuse research that followed paediatrician Henry Kempe and collaborators' agenda-setting proclamation of a "battered-child syndrome" in 1962, this seemingly obvious question was simply never raised. The first published study addressing it was our 1980 demonstration that stepchildren constituted an enormously higher proportion of child abuse victims in the United States than their numbers in the population-at-large would warrant. Subsequent research by ourselves and many others has shown that this excess risk is cross-nationally and cross-culturally ubiquitous.

It is an initially plausible hypothesis that the high incidence of stepfamilies in child abuse samples might be an artifact of biased detection or reporting. However, analysis of homicide cases indicates that the differences are genuine and massive. The youngest children rarely have stepparents, but when they do, studies in Canada, Britain and the United States indicate that their risk of being fatally abused is on the order of 50 to 100 times higher than risk at the hands of a genetic parent. Having a stepparent has turned out to be the single most powerful predictor of severe child maltreatment yet discovered.

Of course, demonstrations of differential risk do not prove that steprelationship itself is the relevant risk factor. It might instead be an incidental correlate of some more directly relevant factor. To date, however, all such hypotheses have failed. There are good evolutionary psychological grounds for predicting that both poverty and maternal youth might be risk factors for child maltreatment, for example, and indeed they are, but they are distinct risk factors whose effects do not account for the stepparent effect. Neither can the effect be accounted for by an overrepresentation of generally violent personalities among remarried persons, since abusive stepparents have been found to be discriminative, sparing their own children within the same household.

The great majority of stepparental abuse and homicide cases with which we are familiar were perpetrated by men. It is not clear, however, that stepmothers constitute a lesser threat. Like stepfathers, stepmothers are clearly overrepresented as child abusers in comparison to their genetic parent counterparts, but so few small children actually live with stepmothers that we have not been able to generate reliable rate estimates.

Homicides perpetrated by stepfathers differ from those by genetic fathers not just in their incidence, but in qualitative attributes, too. In both Canada and Great Britain, for example, we have found that a substantial proportion of the children killed by genetic parents, but virtually none of those killed by stepparents, are slain in the context of a suicide, and the distraught parent may even construe the homicide as a "rescue". Moreover, steppaternal cases are especially likely to involve a violent, assaultive rage reaction: most small children killed by stepfathers are beaten to death, whereas genetic fathers are relatively likely to have disposed of the child by gunshot or asphyxiation.

Infants are taxing. They wail and soil themselves and can be hard to soothe. But the very commotions that can grate on the nerves of bystanders are likely to evoke only attentive concern from a committed parent. Potentially damaging, angry responses are inhibited by parental love, an evolved psychological adaptation that makes the efforts of child-rearing tolerable and even delightful. Stepparents assuredly vary in their degrees of personalized affection for the children, as do genetic parents, but it is equally sure that the average stepparent loves the child less. As we would anticipate from the argument that excess risk derives ultimately from a lesser commitment to that individual child's welfare, stepparents are overrepresented in all forms of child maltreatment: in neglectful as well as assaultive cases, and in sexual misuse, too. We conclude that the higher rates of neglect, exploitation, assault and murder incurred by stepchildren are the most dramatic but by no means the only consequences of a difference in the distributions of parental and stepparental affection.

### **On the Generation of Evolution-Minded Hypotheses**

Space does not permit us to discuss the facts about spousal homicide or those rare cases in which victim and killer are close genetic relatives. Suffice to say that evolutionary thinking has guided our discovery of a number of hitherto unsuspected risk factors and demographic patterns in these types of cases, too.

Evolutionists often generate alternative hypotheses that cannot simultaneously be true. When we began studying spousal homicide, one of us (Daly) hypothesized that wives would incur increasing risk with age, because their declining "reproductive value" would make their husbands value them less. The other (Wilson) proposed instead that uxoricides are largely to be understood as maladaptive byproducts of coercive and proprietary inclinations that husbands feel most extremely when their wives are young. Although it has proved difficult to separate the effects of female age from the correlated effects of male age, marital duration, and parity, it is now clear that Wilson's hypothesis was much closer to the facts than Daly's. Young wives incur the greatest risk and this is not an incidental consequence of the fact that they tend to be married to young husbands.

We are not embarrassed that our evolutionary perspective inspired these alternative hypotheses. For one thing, no one without such a perspective had ever thought to ask how rates of spousal homicide might vary in relation to the marital partners' ages. But there is a more basic point. Evolutionary psychology is commonly portrayed, by both enthusiasts and critics, as another addition to the Babel of rival psychological theories and systems, but this is wrong. What evolutionary psychology is (or, to put it more modestly, aspires to become) is a Kuhnian paradigm shift. In conducting this research, we were certainly not "testing Darwinian theory" nor even testing its "applicability to human social behaviour". We know, as surely as scientists know anything, that living things and their attributes have evolved, and that insofar as those attributes exhibit complex functionality, their properties have been shaped over many generations by selection. Thus, although enthusiastic Darwinists often advance a particular pet idea as "the evolutionary prediction" and pit it empirically against "nonevolutionary" alternatives, this framing misstates what is being tested. Whatever the results of our research, we can be sure that evolved psychological adaptations are behind them.

### **Homicide Outside the Family**

We have devoted much of our attention to the minority of homicides that are intrafamilial, precisely because they have seemed the most challenging from a Darwinian perspective. But most killers are not related to their victims, neither by blood nor marriage, and an evolutionary psychological approach sheds considerable light on these cases, too.

Men kill unrelated men vastly more often than women kill unrelated women, everywhere. Tales of exotic societies in which this sex difference is reversed are fantasies. Criminologists and other social scientists have offered a wide range of hypotheses to explain sex differences in the use of lethal violence, but all invoke local aspects of particular societies, and thus provide no candidate explanation for the phenomenon's cross-cultural generality.

Sex-differential violence appears to be one of many manifestations of the fact that the human male psyche has evolved to be more risk-accepting in competitive situations than the female psyche. Our sex difference in intrasexual violence is one which we share with other species with "effectively polygynous" mating systems: species in which the variance in fitness among males exceeds that among females. The evidence that human beings evolved under a mild degree of effective polygyny is abundant and consistent, and the natural selective link between such a mating system and sex differences in competitive violence is well understood and uncontroversial. Basically, greater fitness variance selects for greater acceptance of risk in the pursuit of scarce means to the end of fitness. Furthermore, "recklessly" life-threatening risk-proneness is especially likely to evolve where staying alive by opting out of competition promises to yield no fitness at all and is therefore the natural selective equivalent of death.

Lethal violence between unrelated men is transparently competitive. "Competition" refers to any conflict of interests in which one party's possession or use of a mutually desired resource precludes another party's possession or use of the same. Robbery homicides are unequivocal instances, as are many "sexual triangle" cases. More subtle examples are the "face" and "status" disputes that constitute a very large proportion (perhaps the majority) of all homicides in the United States; the social resources contested in these cases are limited means to the end of more tangible resources.

Not all conflicts are competitive: if a woman spurns one suitor for another, for example, then she and the rejected suitor have a conflict of interests, but they are not competitors, whereas the male rivals are. In general, competition is predominantly a same-sex affair because same-sex individuals are usually more similar in the resources they desire than opposite-sex individuals.

The rate at which men kill unrelated men is the most variable component of the overall homicide rate (as was implied by the previously remarked point that intrafamilial cases constitute an increasing proportion of all homicides as overall rates decline). The incidence of such male-male killings in a given time and place can be interpreted as a reflection of the local severity of male-male competition. One attractive hypothesis that has yet to receive a good test is that conditions or policies that promote stable monogamy will tend to reduce both the gross homicide rate and the sex difference. A better established hypothesis is that inequity in the distribution of material resources is an important source of cross-national variation in homicide rates. The United States has by far the most inequitable income distribution in the modern west and by far the highest homicide rate. Even if one confines comparisons to western European nations, inequity (measured, for example, by the Gini index) is a significant predictor of the homicide rate.

There is considerable evidence that persons who engage in risky criminal activities "discount the future" relatively steeply. Such "inability to delay gratification" is usually interpreted as a sign of immaturity and pathology, but this seems to us unduly pejorative. The psychological and behavioural tendencies that are disparaged as indicative of a "lack of impulse control" sound a lot like adaptive adjustment of risk acceptance, instead. Steep discounting of the future is just what a properly functioning evolved psyche might be expected to do in the sorts of social and material circumstances that are especially likely to foster violent crime.

One sort of information that ought to affect discounting of the future is information bearing on the likelihood that the future will ever come. Reason to doubt that you'll be alive tomorrow is reason to grab what you can today. An increase in mortality in one's reference group increases the appeal of risky action in pursuit of quick returns, especially if the sources of that excess mortality are independent of the actor's choices. But what sort of evidence would bear on such risk adjustment? One possibility is some sort of semi-statistical apprehension of the distribution of local lifespans. This need not be so complex as it sounds. If a young man's grandfathers were both dead before he was born, and more than a couple of his primary school classmates are already dead too, and gray-haired men stand out in his neighborhood by virtue of their rarity, there may be something going on that he should attend to. Our research in progress suggests that there are large variations in life expectancy between neighbourhoods in a major American city, and that expected future lifespan is a very good predictor of homicide rates, even if expected lifespan is computed with the mortality effects of homicide itself removed. More traditional measures of poverty are of course highly correlated with both expected lifespan and homicide, but expected lifespan is at least as good a predictor as any other. Whether readiness to commit violence is indeed affected by the sorts of "life expectancy cues" suggested above is a question for future research.

One last misconception about evolutionary psychology needs rebuttal. It is often suggested that evolutionists are reactionary supporters of the status quo. In fact, those seeking ideological support for policies whose beneficiaries are the rich and privileged will have to look elsewhere. Evolutionary psychological theory and research come down firmly in support of the proposition

that inequity and desperation are the principal, remediable causes of crime and violence. This is true not only because people are obsessive about social comparison and escalate their competitive tactics when they're losing out, but also because purely punitive crime control, without remediation of inequity and desperation, actually invites increased recklessness.

There is not and never was any basis for "social Darwinism" in evolutionary theory: If the principle of natural selection "justifies" laissez-faire capitalism, it also justifies the plague, by exactly the same logic and to exactly the same extent. ©