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Editorial

Genetic evidence that Darwin was right about criminality: Nature, not nurture

Summary Darwin maintained that man's behaviours, just as the ones of the lower animals, are not cultural products of learning, but constitute evolutionarily selected innate traits that can be transmitted through biological inheritance. Coherently, Darwin wrote that "some elimination of the worst dispositions is always in progress . . . Malefactors are executed . . . so that they cannot freely transmit their bad qualities". Darwin's evolutionary deterministic views about the innateness of human behaviours and the heritability of criminal tendencies proved genially farsighted. Indeed, the scientific evidence that they are genetically determined became indisputable just in this century, about 120 years after Darwin's death. This article, besides discussing human genetic variation and the genetic basis of pro-social traits, focuses on the recent and mounting evidence that points to genes for antisocial behaviours, genes for criminality, and genes for violence. All of them contribute to discredit further the scientifically untenable cultural dogma claiming that human behaviours reflect *nurture*, represented by social environments, not *nature*, in the form of biological factors. Genes for criminality and violence also concur to demolish the ideological dogma espoused by those who assert that criminality is a result of poverty and unemployment. The falsity of that politically biased dogma, as argued in this article, is also demonstrated by the fact that Brazil, despite significant reductions of poverty, socioeconomic disparities, and unemployment during the last five years, is facing a spiralling increase in criminal misdeeds, including homicides, which have reached an alarming rate that is nearly fivefold higher than the already worrying one of the USA. © 2008 Elsevier Ltd. All rights reserved.

Introduction

Charles Darwin, whose "great mind" [1] enabled him to conceive the "triumphant" [1] and "world-changing theory" [2] of evolution, maintained that the moral sense is innate. Indeed, he roundly wrote as follows: "it can hardly be disputed that the social feelings are instinctive or innate in the lower animals; and why should they not be so in man? . . . others believe that the moral sense is acquired by each individual during his lifetime. On the general theory of evolution this is at least extremely improbable" [3, p. 98]. There is growing scientific evidence that Darwin was right about the evolutionary innateness of the social feelings and the moral sense [4–6]. For example, a study published lately in *Nature* [7] showed that 6- and 10-month-old preverbal infants have the capacity to evaluate individuals on the basis of

their social behaviours [7], thereby supporting the view that such a socially beneficial capacity, which "may serve as the foundation for moral thought and action" [7], represents "a biological adaptation . . . [that is] universal and unlearned" [7].

Heritability of human behaviours

In accordance with his certitude of the innateness of the moral sense, Darwin also maintained that both good human behaviours and the bad ones are innate and transmitted by inheritance. Indeed, he unambiguously stated that "In regard to the moral qualities, some elimination of the worst dispositions is always in progress even in the most civilised nations. Malefactors are executed, or imprisoned for long periods, so that they cannot freely transmit their bad qualities" [3, p. 137].

Darwin also pointed out that “If bad tendencies are transmitted, it is probable that good ones are likewise transmitted” [3, p. 124].

Darwin’s genial perception of the biological heritability of good behaviours, which, conversely, were attributed to upbringing and religious precepts by most of his contemporaries, proved quite correct and farsighted. Indeed, nowadays there is compelling evidence that such socially beneficial traits as altruism and cooperation, which various experimental games demonstrated to be very common in humans [4], constitute genetically conserved ancestral behaviours that have been transmitted across generations [4]. The recently observed “strong evidence in favour of a genetic effect” [8] on fairness preferences in the most famous experimental game [8] corroborates Darwin’s views about the heritability of good tendencies. His views are also incomparably strengthened by the mounting evidence that there are genes for altruism [9–11], which may well account for the “large heritability” [12] of pro-social behaviours [12,13], because “heritability measures the genetically determined variation around some average behaviour” [8].

Considering that criminal and violent behaviours, unlike pro-social traits, represent a scourge worldwide, it is not surprising that, leaving aside many theoretical papers on the origins of altruism and cooperation [4], there are only a few studies on the heritability of socially beneficial traits, whereas the investigations on the genetic basis of antisocial behaviour are far more numerous [13]. Their findings demonstrate that Darwin, once again, was right and farsighted. Indeed, there is now incontestable evidence that criminality and violence are caused by genetically determined heritable predispositions.

Antisocial genetic mutations

It has recently been argued that “Darwin’s greatest contribution to science is that he completed the Copernican Revolution by drawing out for biology the notion of nature as a system of matter in motion governed by natural laws... The Copernican and the Darwinian Revolutions may be seen as the two stages of the one Scientific Revolution. They jointly ushered in the beginning of science in the modern sense of the word: explanation through natural laws” [14].

Rather surprisingly, despite the Darwinian and the Scientific Revolutions, most intellectuals and even many scientists are still reluctant to accept some inescapable social implications of Darwin’s

theory of evolution. This theory “conveys chance and necessity, randomness and determinism” [14], because it is based on the concept of “spontaneously arisen variations (mutations) sorted out by natural selection” [14], which eliminates the disadvantageous ones. For example, one of these unfavourable variations consists in the recently reported “gene variant” [15] that causes a “genetically determined... deficit in learning from errors” [16]. An important social implication of Darwin’s evolutionary theory based on “Mutation and selection” [14] is that human behaviours, including both the socially valuable altruistic traits and the socially condemnable selfish ones, which characterise most criminals, reflect heritable predispositions originated by random mutations. Indeed, as has lately been stressed, “gain-of-function mutations were invariably found” [10] in highly altruistic persons [10], “whereas loss-of-function mutations were invariably found” [10] in profoundly selfish individuals [10].

In 2006, Cohen aired the following view: “Darwin put chance variation at the heart of the dynamics of evolution, and the science of chance variation in all branches of science is, without doubt, the major conceptual advance of the last 150 years. Sorry, Einstein” [1]. This view has indirectly been supported authoritatively by *Science* in its last issue of 2007, in which “Human genetic variation” [17] was defined “Breakthrough of the Year” [17,18]. A homonymous editorial appropriately emphasised that “A flood of scans for these variations across the genome has pointed to genes involved in behavioural traits” [18].

Although both the view of Cohen and the choice of *Science* are probably shared and approved by most scientists, who are also likely to agree that “Evolution is the unifying concept of biology and the basis for all modern biological research” [19], nevertheless some of them, let alone innumerable intellectuals, not only ignore the evolutionary implication suggesting that criminality reflects antisocial genetic mutations, but even reject Darwin’s biologically deterministic explanation for human behaviours. This rejection, however, has to do with ideology [20], not with science, and represents an expression of an old debate, namely, “the nature versus nurture controversy” [21].

Nature versus nurture

As Plomin correctly remarked, “Behaviour has been the battleground for the nature-nurture war” [22] that began more than a century ago.

In mid-life, Sir Francis Galton was so taken with his cousin Charles Darwin's book on the origins of species that he devoted the rest of his life to consideration of heredity and human behaviour [22]. Galton coined "the convenient jingle of words, *nature and nurture*, and argued that nature prevails enormously over nurture" [22]. In the early part of the last century, Galton's view of the importance of nature was influential, but the horrors of the Nazis created "a revulsion towards all things genetic" [22]. After the Second World War behavioural science was "dominated by environmentalism" [22], which assumes that we are what we learn.

The nature versus nurture controversy, which still constitutes a hotly debated topic, is merely one of the several forms of the very old and ongoing conflict between science and dogmas, which include religious beliefs [6], philosophical tenets [5], and ideological doctrines [4].

Science versus ideology

Environmentalism, because of its indirect political support to those who believe in what has been defined "ideologically-based dogma and taboo" [23], namely, the "communistic ideas about the influence of education and environment" [24], was championed by many intellectuals and politicians. Their ideological views about criminality are epitomised in these words: "the roots of crime are in social causes – poverty, racism, and unemployment – that call for social solutions, not biological ones" [25]. However, as James D. Watson, the Nobel Prize-winning co-discoverer of the DNA molecule, most cogently underscored, "past eugenic horrors in no way justify the 'Not in Our Genes' politically correct outlook of many left-wing academics. They still spread the unwarranted message that only our bodies, not our minds, have genetic origins. Essentially protecting the ideology that all our troubles have capitalistic exploitative origins, they are particularly uncomfortable with the thought that genes have any influence on intellectual abilities or that unsocial criminal behaviour might owe its origins to other than class or racially motivated oppression" [26].

Although the current system of capitalism is not perfect [27] and "An upgraded version of capitalism is needed" [27], only those who are ideologically misled by "doctrinaire anticapitalism" [28] can unjustly blame capitalism even for antisocial behaviours. Indeed, these socially destructive traits, being due to innate predispositions, can be found in all societies, including the "vehemently

egalitarian" [29, p. 166] ones, which could hardly be more distant from capitalism. For example, as Boehm tellingly pointed out, "in spite of egalitarian enculturation ... today's hunter-gatherers still have to use capital punishment ... [and] resort to execution of serious deviants" [29, pp. 166, 167]. This indisputably demonstrates that such disliked individuals behave antisocially as a result of their biological predispositions to do so, not because of capitalistic socioeconomic inequalities, which are nonexistent in the egalitarian communities of today's hunter-gatherers.

The case of Brazil

On October 29, 2006, "Brazilians cast a vote of confidence for President Luiz Inacio Lula da Silva ... granting a landslide victory to the former union leader whose first term was marked by a significant reduction of poverty ... minimum wage increases and millions of new jobs" [30]. As a result, many Brazilians "have seen tangible improvement in their lives thanks to Lula's policies, which have lifted some 8 million people out of poverty" [31]. As pointed out in *The Washington Post*, "poverty rates have dipped since he was elected ... thanks in part to increased government social spending, lower inflation and a stable currency" [32]. Indeed, "The Brazilian currency, the real, has gained 60% on the dollar since Lula has been president, which has helped keep prices down. The proportion of the population living in poverty has fallen from about 24% to about 18.5%" [33]. As recognised by an internal report of the World Bank, in Brazil there have been "significant advances against poverty because wealth has been distributed more evenly" [34].

If the claim that criminality is caused by poverty and unemployment were right, then criminality in Brazil should have lessened thanks to the significant reduction of poverty and millions of new jobs [30]. On the contrary, as a clear evidence that the abovementioned ideological claim is false, the "increasing crime on the street" [35] provokes "growing concerns about deadly violence" [36], because "the urban violence that is spiralling out of control" [37] and "the advance of criminality which threatens public order" [37] demonstrate that "Brazil's public safety policies are in shambles" [35]. Worryingly, in April 2007, it has been stressed that "In January [2007] the murder rate jumped 26% compared with the same month last year" [37]. In May 2007, "Amnesty International said the government's inability to provide security

had transformed Brazil's largest cities into a 'patchwork of violent fiefdoms' ... [and] had left poor Brazilians in the crossfire between police and criminals – the victims of stray bullets" [38].

Notably, other events that occurred recently in Brazil constitute additional evidence that the ideological dogma claiming that poverty and unemployment account for criminality is patently wrong. Indeed, this dogma blatantly fails to explain why such socially destructive crimes as embezzlement and corruption, which is a "global problem" [39] that also affects rich nations [39], "siphons public wealth into private hands" [40], and "eats away at the economies of poor countries" [39], are committed by individuals who are far from being poor and unemployed. For example, every member of the Brazilian congress "gets an annual wage and benefits package that exceeds half a million dollars" [41]. Nevertheless, "about one-fifth of the members of Brazil's 594-member legislature are being investigated for illegal acts" [42] in the context of what has been defined "the most well-documented scandal of corruption in the history of Brazil" [43]. Considering that the monthly wage of those members is about forty times higher than the one of a third of Brazilian workers [44] and that millions of Brazilians are admirably honest and good citizens despite being poor, it is very hard to credit the ideological claims about poverty as root of criminality.

Ideological obstacles

The implausibility of those politically biased claims was already quite evident to objective and rational persons nearly thirty years ago and, therefore, some scientists began conducting research on the possible biological and genetic causes of criminal behaviours, thereby troubling many ideologists and intellectuals, who attempted to suppress that innovative and promising scientific research [45].

In 1995, despite the fact that there was already "clear evidence for a genetic role in criminality" [46], as shown by several studies on individuals adopted at an early age [47–52], the abovementioned ideological dogma prompted some of its advocates to protest against a conference on genetics and crime [25]. This meeting, because of ideological pressures, had been "protested, cancelled, rescheduled, and otherwise dogged by controversy ever since it was first planned" [25] three years earlier. As a further confirmation that ideological dogmas tend to hamper the progress of science [4], those vociferous protesters demanded to block scientific research on the biological basis of

criminality [25]. As one of the conferees correctly remarked, however, "if we were to block biological research, then the protesters who came to this conference would have to live with the blood of innocent victims on their own hands – the victims of crime we could have prevented if biological research was allowed to continue" [25].

Fortunately, in spite of its ideological and political opponents, that scientific research based on behavioural genetics continued and flourished, thereby allowing scientists to demonstrate that antisocial behaviours, including criminality and violence, are caused, respectively, by "genes for antisocial behavioural traits" [53], "genes for criminality" [54], and "genes for susceptibility to violence" [55].

Genes for antisocial behaviour

The genetic bases of antisocial behaviours have clearly been demonstrated by several investigations [47,53,56–66]. In 2007, a study reported "significant associations" [53] of antisocial traits with some specific genes that are expressions of "genetic variation" [53]. Another study published in 2007 has been able "to demonstrate strong heritable effects on antisocial and aggressive behaviour in ethnically and economically diverse samples" [57]. Lately, a group of researchers, besides reporting "significant heritability" [58] of antisocial behaviour, identified "a single genetic factor influencing antisocial behaviour beginning at age 10 through young adulthood" [59].

Some investigators have recently explored "The well-documented relation between the phenotypes of low IQ [intelligence quotient] and childhood antisocial behaviour" [60] and found that "Genetic influences common to both phenotypes explained 100% of the low IQ-antisocial behaviour relation" [60]. Other authors reported that "genetic risks contribute strongly to population variation in antisocial behaviour that emerges in early childhood" [64], as shown by the fact that 82% of this variation "was influenced by genetic factors" [64]. The heritability of these factors may well account for the observed "Continuities in antisocial behaviour ... across three generations" [67].

Genes for criminality

The scientific evidence showing that genes for criminality do exist derives from many studies [47–52,68–74]. In 2007, a particular genetic variation has been found to "confer an increased risk

for criminal behaviour” [68]. This finding confirms the one of a previous study [69], which, in turn, “strongly supports the notion” [69] that the same genetic variation “increases the risk of male adolescent criminal behaviour” [69]. The genetic inheritance of criminality was convincingly demonstrated by a group of Finnish researchers who, in 2002, reported that “The risk (odds ratio) was increased up to 24-fold for violent crimes, and up to 17-fold for criminality among the offspring of homicide recidivists” [70]. In view of the impressive heritability of criminality, it is not surprising that a study has lately reported the “first evidence of transmission of crime across three generations” [75].

Not only the abovementioned recent studies, but also many others published previously substantiate the notion that criminality is transmitted genetically. For example, in 1996 Lyons observed that “Genetic factors, but not the common environment, significantly influenced whether subjects were ever arrested after age 15, whether subjects were arrested more than once after age 15, and later criminal behaviour” [73]. In 1990, it was reported that “criminality/delinquency in a biologic parent predicted adult adoptee ASP [antisocial personality]” [47]. In 1989, a study found that “convicted females appeared to be more genetically predisposed than convicted males, a conclusion based on the finding that female property offenders were more likely than male offenders to have convicted biological (but adopted-away) offspring” [48].

In 1984, a study published in *Science* reported that “A statistically significant correlation was found between the adoptees and their biological parents for convictions of property crimes... Siblings adopted separately into different homes tended to be concordant for convictions, especially if the shared biological father also had a record of criminal behaviour” [49]. A meta-analysis of 3 studies published in 1982 [50–52], which explored the inheritance of criminality in 913 women and 862 men adopted at an early age by non-relatives, underlined that “Most explained variation in petty crime was due to differences between the genetic predispositions of the adoptees” [74].

Genes for violence

That violent tendencies are genetically determined has clearly been shown by several articles [46,76–85]. Recently, many studies “have begun to explore the influence of genetic mutations on brain function” [86]. In 2006, one of these studies iden-

tified “neural mechanisms associated with one specific gene epidemiologically associated with risk for violent and impulsive behaviour” [76]. A Dutch kindred with this socially harmful gene, which is the result of a genetic mutation [85], “exhibited a pattern of impulsively violent criminal behaviour for generations” [76]. Likewise, another specific gene [79,82] has frequently been found in persons “characterized by recurrent and overt physical violent behaviour” [79]. Moreover, an additional specific gene “increases the risk of irritability and direct aggressiveness more than six and 10 times” [62].

Aggressive and non-aggressive antisocial behaviour, which are both heritable [80], reflect common and specific genetic factors [77]. In 2006, a study in 5-year-old twins found that heritability was around 45% for aggressive behaviour [78]. Other researchers observed that “In childhood, aggressive antisocial behaviour was highly heritable and showed little influence of shared environment... The continuity in aggressive antisocial behaviour symptoms from childhood to adolescence was largely mediated by genetic influences” [81]. Just as in the cases of the heritable genes for antisocial behaviour and criminality, also transmissible genes for violence may well account for the reported “aggressive behaviour across three generations” [87].

Inhuman mutants

As Meyer-Lindenberg and co-workers have rightly underscored in a recent article [76], “a distinction can be drawn between so-called impulsive-reactive and instrumental, goal-directed dimensions of aggression... The instrumental factor has been associated with psychopathy... The genetic data... suggest that these two dimensions may be genetically dissociable” [76]. This same distinction was highlighted formerly by others [88,89]. Considering that “The definition of *psychopathy* itself is quite controversial, no less than the construction of any scale to measure it” [90, p. 16] and that the impulsive dimension of aggression is caused by a specific genetic mutation [76,85], it seems obvious that what is inappropriately defined “psychopathy” represents a mere expression of another specific genetic mutation transmissible hereditarily. This view is compellingly supported by the “remarkably high heritability” [91] of some typical “signs of life-long psychopathy... [that are] under extremely strong genetic influence and no influence of shared environment” [91].

The term ‘‘psychopathy’’, coined to define those peculiar signs, is clearly inappropriate because its suffix ‘‘-pathy’’, which derives from the ancient Greek word *pathos* (suffering) and is properly used to define afflictively impairing diseases, such as angiopathy and nephropathy caused by other genetic mutations [92], does not reasonably apply to healthy and unimpaired individuals who are often ‘‘successful’’ criminals [93] characterised by ‘‘selfishness, callousness, lack of empathy, ... unemotionality’’ [94], ‘‘interpersonal manipulation ... and social deviance [95]. Instead of being called ‘‘psychopaths’’ [89], these socially destructive individuals, whose homicidal crimes are ‘‘Nearly all (93.3%)’’ [89] for selfish goals, ‘‘In cold blood ... [and] with premeditation’’ [89], should more aptly be defined ‘‘inhuman mutants’’, a definition that captures both their genetically determined [91,94,96] monstrous deviance and their socially revolting inhumanity. The adjective ‘‘inhuman’’ is not inappropriate, because most humans, unlike those selfish antisocial mutants, still conserve genes for unselfishness, cooperation, and even altruistic self-sacrifice for the common good [4], all of which enabled the typically small groups of our ancestors to survive in their harshly savage habitats [4].

The misleading nature/nurture interplay

As a probable consequence of the widespread ‘‘cultural dogma’’ [4] that misleads even some scientists to reject biological explanations for human behaviour and to prefer the cultural ones [4], there are many authors who believe that antisocial behaviours, including criminality and violence, reflect the ‘‘interplay’’ [97] between ‘‘nature and nurture’’ [97]. Their belief, however, is both deceitful and socially detrimental, because this ‘‘Genetic-environmental interaction’’ [84] may explain negligibly ‘‘transient’’ [59] antisocial behaviour at puberty [59] and rare forms of reactive ‘‘socioemotional hypersensitivity’’ [98], but fails completely to account for socially devastating planned crimes, such as corruption, robberies, instrumental violence, and premeditated homicides, thereby resulting in the preservation of socially ruinous anti-crime policies, including the Brazilian ones criticised by Amnesty International [38].

Most legislators, being generally imbued with cultural and philosophical concepts but unfamiliar with scientific facts, substantially belong to the legions of intellectuals who ‘‘are unwilling to face the fact that there are genetic influences on behav-

our’’ [99]. This unwillingness, as implied by Watson [26], reflects what he defined ‘‘politically correct outlook’’ [26], which has to do with philosophy, not with science. Indeed, as has pointedly been stressed, ‘‘Neither the genome nor the brain is conveniently divided into politically correct and incorrect regions’’ [99]. Despite their unfamiliarity with science, most legislators are aware that behavioural genetics dismantled their cherished environmentalism. Expediently, therefore, they welcome the scientifically proposed gene-environment interaction, because its vagueness, by allowing them to underplay the role of genes and emphasise the one of environment, enables them to conserve politically correct anti-crime laws that are far more concerned with the well-being of criminals, including cold-blooded murderers, than with the health and lives of their victims.

Most incisively, it has lately been written as follows: ‘‘Crime is a consequence of injustice. No. Crime is a consequence of criminals. The injustice of Brazil’s social inequities is ghastly...But kidnapping children and torturing people do not serve the larger ends of wealth redistribution. If the country needs a revolution, so be it. But fingernail plucking and ear severing are barbarities that do nothing to balance the scales’’ [40]. Even supposing that poverty and social inequities really constitute unfavourable environmental factors that concur with predisposing genes to produce those barbarities, it would be either patently unreasonable or intellectually dishonest to explain them with the nature/nurture interplay. Indeed, it can plausibly be hypothesised that, at most, just 1 out of 100 poor and disadvantaged individuals kidnaps children, plucks fingernails, severs ears, or commits other similarly hideous crimes.

Since no sensible person would honestly invoke the nature/nurture interplay to account for the serious gastrointestinal complaints experienced by just 1 out of 100 hosts who shared and ate a wedding cake, it is unclear why we should invoke that interplay to explain those crimes. Yes, it is unquestionable that, on purely abstract and theoretical grounds, those complaints do reflect the nature/nurture interaction, because they are a consequence of both the biological characteristics of the harmed host and the ingestion of that sweetened *nurture*, without which they would have not occurred. But it is also indisputable that, practically, the complaints of that single damaged host are to be ascribed entirely to his biological proneness to develop them. Analogously, the genetic predisposition to criminality should be regarded as the unique responsible for the misdeeds of criminals.

It is time, therefore, to reject decisively what Brazilian journalists have justly defined “The false question of poverty” [100] in their article commenting on the relatively privileged socioeconomic conditions of armed criminals whose robbery resulted in the consciously perpetrated gradual dismemberment and decapitation of a 6-year-old child [100,101]. This horrendous murder that was committed a few weeks after a monstrous crime, during which two armed robbers killed a 5-year-old child and his parents by burning them alive premeditatedly [102], prompted another Brazilian journalist to write that “Brazil is in the emergency room of a social tragedy in which the bandit decides whom lives and whom dies” [103]. This statement is understandable, because in Brazil the rate of homicides is nearly fivefold higher than the already worrying one of the USA [104].

Nature misinterpreted as nurture

Unfortunately, the cultural dogma, environmentalism, and their politically correlated ideology are still so powerful and common that they misled several researchers to interpret erroneously some effects of genes as consequences of environment, thereby further undermining the credibility of the frequently invoked nature/nurture interplay. For example, the aggressive parenting that results in childhood maltreatment [105–110], which harms behaviourally only children with a special genotype [111,112], has been viewed as a deleterious environmental factor that predisposes children to “later violent offending” [106], “violent delinquency” [105], and “adult antisocial and violence related behavioural problems” [108]. All of these violent antisocial behaviours, however, can be explained far more plausibly by the thesis that they have been transmitted genetically, not culturally. If we fail to bear in mind the deceptive effects of the cultural dogma, we cannot but wonder why “aggressive parenting” [87,113] across three generations, instead of being regarded as a genetically transmitted behaviour, has been misinterpreted as a finding “consistent with a social learning perspective” [87].

Low social status, which leftist ideologues emphatically claim to be an unfavourable environmental factor that is largely responsible for criminality, represents another example of nature misinterpreted as nurture. Indeed, the “low intelligence” [114] that has consistently been reported to be “strongly associated” [114] with delinquency [114], antisocial behaviour [60], and male criminal

violence [115] may well account for the low social status of many criminals, especially the violent ones, whose coarse instrumental aggressiveness reflects their mental inability to use more intelligent criminal strategies for exploiting honest people. Even presupposing the improbable fact that criminals, despite their notorious laziness and propensity to social parasitism, are really intentioned to work, it is obvious that their low intelligence prevents them from obtaining well-remunerated jobs. Indeed, considering that “Human adults evaluate people rapidly and automatically on the basis of both behaviour and physical features” [7], it is unlikely that employers are willing to offer those coveted jobs to individuals whose low intelligence and antisocial inclinations are easily perceivable.

It should be emphasised that, just in the case of poverty discussed above, low social status in itself is not associated with criminality. Indeed, an ample study conducted in Sweden found that “Low social status alone was not sufficient to lead to criminality, but did increase risk in combination with specific types of genetic predisposition” [51]. These specific types, however, in the form of genetically determined synergistic combination of low intelligence and tendency to criminality [60,114,115], are the causes of low social status, not its effects. Needless to say, low intelligence alone, too, does not predispose to criminality, as shown by the great number of poorly intelligent persons who are laudably honest and good citizens. It must also be stressed firmly, however, that in multiracial countries, especially in the USA, the low social status of some individuals of ethnic minorities may not be a consequence of low intelligence, but may simply reflect the obtusely preconceived ideas of employers who perpetuate anachronistic and odious discriminations against those groups.

Conclusion

In *Nature*, it has rightly been written that “Surely, if doctrines were to have health warnings attached to them objectively assessed by the number of individuals they had harmed, the fashionable Marxist belief that the social environment is much more important than anything else would be rated many times more harmful than any acknowledgement of the influence of genes” [116]. Indeed, millions of honest citizens have been harmed and killed by criminals after the legislators’ espousal of social environmentalism some decades ago. Regrettably, the number of those victims of criminals is unavoid-

ably doomed to rise further, unless policymakers will at least realise and admit that criminality, far from being a consequence of environmental socioeconomic factors, is essentially a biological phenomenon that reflects genetically determined antisocial predispositions. As such, criminality, and especially its worst expression, namely, premeditated homicidal violence, should be regarded as a public health problem [117] and must be prevented with modern policies based on science, not on obsolete ideological dogmas or “moral” principles invented extemporaneously by philosophers in the last minute of the evolutionary clock [5,6].

Evolution, not philosophy, originated morality [5,6], which explains why most humans, driven by the genetically conserved “egalitarian motives” [118,119] and altruistic behaviours that enabled the small ancestral groups to survive in their hostile surroundings [4], feel the moral imperative to reduce poverty and socioeconomic inequalities. Likewise, most humans, driven by the evolutionary [120], altruistic [119,120,122], neurobiological [121,122] punitive instinct that enabled those small hunter-gatherer groups to prevent their extinction by executing socially destructive deviants [29], also feel the moral imperative to use capital punishment for reducing the cold-bloodedly premeditated assassinations of countless honest citizens, including innocent children [117].

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