For example, there is a very important difference between those who inflict physical and psychological pain or suffering on animals as a "by-product" of their activities and those who do it because they enjoy or gain some other satisfaction from causing suffering. Nell, I suspect, is most concerned about this second, very rare behavior when he argues for the reinforcing nature of the PBD complex, but then ranges much further afield in discussing "cruelty" as a social control measure. The rare occurrence of sadistic cruelty, except in important instances of mass recruitment and pathology (e.g., the Rwandan genocide) or mass moral blindness (e.g., the Holocaust), leads one to question why such cruelty is not more common if the PBD complex has such a fundamental biological basis in our cultural lives.

Someone who engages in abusive behavior (an act of commission) should be distinguished from someone who is simply *indifferent* to or *ignorant* of the same suffering (an act of omission) – (see Rowan [1999] for a more detailed discussion of cruelty definitions). In fact, in instances of apparent "indifference" to suffering, the onlooker may be using various protective devices, either societal or personal, to ignore, obscure, or justify the suffering. The importance of being very careful in how one defines cruelty is demonstrated by an important review of cruel behavior by Felthous and Kellert (1987). Felthous and Kellert looked at studies examining the links between cruel and abusive behavior towards animals and towards humans. The studies that found no such link defined animal cruelty and abusive behavior to humans very broadly. The studies that did find a link used much more restrictive definitions of both animal cruelty and abusive behavior toward humans.

Many people fall into the category of those whose activities might cause suffering to sentient creatures but who either discount or deny the existence of such suffering or who argue that the suffering is an unfortunate by-product of an activity that is beneficial or necessary. For example, workers in animal-slaughtering facilities often either discount or ignore the animal suffering (see Grandin 1988). Those who perform medical experiments on animals often cause physical or psychological suffering (somewhere between 10% and 45% of research animals experience suffering; cf. Anonymous 1999), and their actions are deliberate and premeditated. However, animal suffering in research projects is neither necessary nor desired.

Sadistic cruelty – where the animal suffering is both intentionally inflicted and enjoyed by the actor – is both rare and the subject of very little serious scholarship. Nearly all the pertinent literature on the links between animal and human abuse could have been gathered into a single volume (Lockwood & Ascione 1997), and scholarly studies of cruelty to animals are even more limited. Two South African authors analyzed 1,863 cruelty cases from four SPCAs in South Africa over a one-year period (Vermeulen & Odendaal 1993). More than 80% of these cases involved neglect (acts of omission) rather than abuse or sadistic cruelty. The analysis did not differentiate between sadism and other forms of abuse such as an anger-induced over-reaction. Out of 80,000 complaints received by the Massachusetts SPCA over a 20-year period, only 268 cases were prosecuted, all of which involved some form of deliberate abuse (Arluke & Luke 1997).

Nell briefly discusses the fact that the enjoyment of human and animal suffering is now far less common than in the past and suggests it is because of the social controls exercised by modern, developed societies. Yet, the Rwandan and Serbian activities illustrate that the human ability to be sadistic or to suspend normal moral constraints is still alive and well. We now know that an exposure to a violent or abusive environment is a very strong predictor of later abusive behavior. However, only a minority of children brought up in an abusive household continue the cycle of abuse. If the PBD complex was as important a reinforcer as Nell claims, would we not expect the proportion of children who continue the cycle of abuse to be much higher? Zimrin (1986) reported that the "survivors" of an abusive upbringing (i.e., those that did not continue the abuse cycle as adults) were distinguished from the "non-survivors" by three characteristics – they had an adult mentor in their lives who supported them, they had strong fantasy lives, and they had the responsibility for caring for another being such as a sibling or an animal.

Interestingly, a proportion of those who suffer abuse as children not only avoid continuing the cycle of abuse, but they become what might be termed "super-nurturers." These are individuals who often end up in a caring profession (such as child protection or animal protection). For example, Quinlisk (1999, p. 169) reported that 2 of 49 children from abusive households had become "super-nurturers," and I personally know a number of animal activists who were abused as children, and who described how their care of animals taught them how to care (see Zimrin 1986). If the PBD reinforces cruel behavior, then how would such an outcome be explained?

In sum, we need to be much more careful in how we define and use the word *cruelty* if we are to understand its manifestations and its biological roots. If the "thrill of the kill" is self-reinforcing, as the presence of a PBD complex might imply, then how does being raised in an abusive household lead some into continuing that behavior as adults, while others end up at the opposite extreme as super-nurturers?

Executive function and language deficits associated with aggressive-sadistic personality

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Abstract: Aggressive-sadistic personality disorder (SPD) involves derivation of pleasure from another's physical or emotional suffering, or from control and domination of others. Findings from a head-injured sample indicate that SPD traits are associated with neuropsychological deficits in executive function and language, suggesting difficulties in frontal-lobe-mediated self-regulation of aggressive and emotional impulses. Implications for rehabilitation of aggressive offenders are discussed.

Human aggression is the result of a complex interplay of biological, psychological, and social influences. Nell provides an intriguing exposition of the evolutionary context of cruelty that takes into account the interactive nature of genetic, neural, instinctual, and environmental forces in shaping aggressive behavior in primate species. The functional neuroanatomy of aggressive behavior in humans, however, might best be conceptualized as involving reciprocal relations among neurobiological systems, higher-order neurocognitive processes, distal organismic factors, and environmental antecedents and consequences.

Nell's account of the functional neuroanatomic underpinnings of cruel behavior implicates the involvement of multiple subcortical systems commonly regarded as primary circuits that mediate the expression of aggressive behavior. These neural systems, however, have largely been studied in primates using stimulation techniques, and the extent to which studies of this nature can be generalized to human aggression is unclear. In humans, capacity for higher cognition requires that models of aggression accommodate neurobiological systems that might mediate such behaviors and the ways in which these systems may go awry. Neuropsychological findings provide rich information about the neurocognitive functions and associated neuroanatomic subsystems and regions that may be implicated in aggressive behavior. Unfortunately, inconsistent operationalizations of aggression and cruelty in humans have largely precluded meaningful study of these constructs from a neuropsychological perspective (Blake & Grafman 2004).

Most neurobiological investigations of aggression have tended to focus on persons with antisocial personality disorder (APD), psychopathy, and violent offenders; however, little is known about the aggressive-sadistic personality disorder (SPD). SPD is a condition characterized by derivation of pleasure from another person's physical or emotional suffering, or from the control and domination of others (Meloy 1997). The Millon Clinical Multiaxial Inventory–III (MCMI–III; Millon et al. 1997) provides an assessment of APD and SPD traits, and research has largely substantiated the validity of these scales (Holt et al. 1999).

Although there exists a large neuropsychological literature examining APD and psychopathy, only limited evidence is available for SPD.

Recent findings implicate a subset of neurocognitive deficits associated with SPD traits that clearly diverge from those related to APD, and they also implicate the involvement of more anterior regions in traits associated with cruelty and aggression (Ruocco & Swirsky-Sacchetti, in press). The neuropsychological profiles of 161 patients referred for neuropsychological evaluation following closed head injury were examined in relation to their standings on MCMI–III personality scales, including APD and SPD indices. Deficits in executive function and language were associated with SPD traits, even after accounting for shared variance with other neuropsychological domains of function. APD traits, on the other hand, were solely associated with language deficits.

The findings highlight key neurocognitive differences that may exist between SPD and APD. Studies indicate that whereas MCMI–III SPD traits emphasize emotional acting out, strong-willed determination, social independence, and defensive aggression, APD is associated with social mistrust, social independence, and behavioral acting out (see Choca 2004). Compared with APD, SPD appears to be more strongly associated with overt emotional and defensive aggression, rather than psychopathic and competitive attitudes, as is more characteristic of the APD scale. Although both traits are associated with language deficits, only SPD traits are associated with poor performance on tests of executive function.

The executive functions are higher-order regulatory and supervisory functions carried out primarily by the frontal lobes (Miyake et al. 2000). Component cognitive processes considered part of the executive system are the functions of planning, mental flexibility, and inhibitory control. The observed decrement in executive function in relation to SPD traits may represent deficient functioning in any of these subdomains. Given the predominance of emotional and defensive aggression implicated in SPD traits, deficits in executive function may underlie poor self-regulatory skills in the domain of inhibitory control, whereby specific antecedent conditions (e.g., insult, perceived threat) may trigger a prepotent emotional or defensive reaction that individuals may have difficulty inhibiting. Moreover, deficits in language skills may escalate difficulties associated with executive dysfunction, whereby successful communication of emotional reactions to the perceived aggressor may be hampered and lead to further problematic interpersonal exchanges.

In contrast, no executive function deficits were associated with APD traits in the head-injured sample. This is consistent with meta-analytic findings that revealed only minor deficits in executive function for APD groups compared with larger deficits for groups with overt antisocial behavior problems, such as psychopathic offenders (Morgan & Lilienfeld 2000). The implication of language deficits in association with APD traits, even when controlling for level of education, suggests that there may be problems in the way that individuals high in APD traits communicate with others. This is a finding common to SPD traits and necessitates further exploration to examine the nature of language difficulties for persons with strong antisocial and sadistic tendencies.

These observations are intriguing because they are drawn from a sample of individuals with a wide range of functioning in neuropsychological and personality domains, from normal to impaired or disordered. The implication is that SPD traits exist along a continuum and that functioning in executive and language domains coincide with these traits across a wide range of functioning. Indeed, Nell's neurobiological account of aggression in primates does not postulate that such behavior or the underlying neural mechanisms are maladaptive; on the contrary, they are necessarily adaptive for the species. It may well be the case that maladaptive forms of aggression in humans, in the context of an orderly society, are invoked primarily by deficient regulation of more primitive subcortical systems by anterior brain regions. Certainly, the orbitofrontal and ventromedial frontal cortex play important roles in regulating key systems associated with emotional responses based on analyses of context (Ochsner & Feldman Barrett 2001). The "controlled" nature of functioning of these systems stands in contrast to the more "automatic" processing engaged by more subcortical and primitive structures of the amygdala and basal ganglia.

Given these considerations, rehabilitation of psychopathic offenders ought to take into account the integrity of executive functions, language skill, and the presence of SPD and APD traits. Offenders who possess strong sadistic tendencies would seem to necessitate attention to deficits in both self-regulatory abilities and language skill, whereas antisocial persons who do not have sadistic qualities may benefit more from interventions aimed at improving communication abilities. Cognitive rehabilitation may be appropriate for ameliorating problems with executive function, particularly inhibitory control of emotional and impulsive behaviors, a skill crucial for successful societal engagement. Rehabilitation service delivery professionals ought to be acutely aware of the unique neurocognitive deficits associated with SPD and APD and the ways in which these might impede progress in therapy and community reintegration.

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Nice idea, but is it science?

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Abstract: In the target article, human cruelty is linked to intrinsic reinforcement from engaging in the behavior without any recommendations for a research program to validate or test for such reinforcement and its independence from ultimate adaptive outcomes. Suggestions are offered in this commentary for such a program.

The target article suggests that human cruelty exists to deliberately inflict pain and suffering on others because it is intrinsically pleasurable and rewarding, that is, a goal in and of itself. In principle, there is nothing intrinsically wrong with the idea of behaviors that can be intrinsically reinforcing (e.g., Harlow 1953). Play behavior, for example, seems to offer this possibility of performance without evidence of any immediate material outcome (Bekoff & Byers 1998), and Schuster and Perelberg (2004) have suggested that intrinsic reinforcement linked to the *behavior* of cooperating could explain why cooperation can persist when it is not immediately beneficial. Moreover, the existence of both play and cooperation can be linked to long-term benefits that impact on fitness. In the case of