Victims of our brain: born or made a criminal?

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Forensic psychology is a broad spectrum of topics related to both psychology and law issues. One of the more clinical issues involved in forensic psychology is the concept of criminal behaviour, in particular psychopathy. Although the construct of psychopathy has been the subject of a great deal of research, much still remains unclear. Biological factors such as genetics and HPA axis (re)activity seem to play an important role in the development of criminal psychopathic behaviour. The relationship between violence recidivism and psychopathy, and the fact that psychopaths lack moral emotions are important risk factors in the maintenance of criminal behaviour. Given the heterogeneity of psychopathic offenders, the effect of treatment still remains unclear. Consequently, the question arises whether we all are victims of our brain and, thus, treatment of criminal behaviour is useless. Or whether it is possible to alter criminal behaviour? In addition to this discussion, an overview of the content of this special issue will be presented. (*Netherlands Journal of Psychology*, 63, 112-116.)

Forensic psychology constitutes a broad spectrum of issues in the boarder context of psychology and law. For instance, it includes topics such as profiling, interrogation techniques, criminal behaviour, and eyewitness testimonies. This special issue 'Forensic psychology; new developments in theory and research', focuses on criminal behaviour, and in particular psychopathy. There are several motives behind choosing this specific topic. First, criminal violent behaviour represents the core issue within forensic psychology. Without criminals, there is no need for forensic psychologists. Secondly, criminal behaviour is a very complicated concept. Much is still unclear about the aetiology, development, and treatment of psychopathic offenders. Therefore, we have chosen to focus on the developmental aspects, risk factors and treatment of criminal, psychopathic behaviour. More specifically, this special issue highlights a number of topics from various themes. First developmental studies on psychopathic, criminal behaviour are included. These focus on young childhood (relationship with conduct disorder) and on adolescence (biological aspects). Since psychopathic traits in adults predict a particularly severe and violent pattern of antisocial behaviour that is resistant to many intervention approaches (Hart, Kropp & Hare, 1988; Harris & Rice, 2006; Serin, 1993), several articles are included in which the focus lies on the adult psychopath (relationship

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between psychopathy and violence, moral emotions, and brain imaging research of violent behaviour). Besides this developmental approach in which several aspects related to psychopathic behaviour are described in children, adolescents and adults, this special issue also includes a biological as well as a more cognitive line of approach in which most recent developments regarding theory and research of criminal behaviour are presented. Finally, the question whether criminal behaviour can be treated is discussed in the concluding article of this special issue.

Overview

One of the risk factors for psychopathic traits developing later in life is a diagnosis of conduct disorder (CD; APA, 1994) in childhood (Christian, Frick, Hill, Tyler & Frazer, 1997). Given the strong continuity of antisocial behaviours from childhood into adulthood, the question arises whether the 'fledgling psychopath' can be identified in childhood. However, little is known about the risk factors in CD children relating to the development of psychopathic and/or antisocial traits. The first contribution in this special issue therefore concerns the occurrence of psychopathic traits in young children. In their contribution, Jones and Viding (2007) argue that psychopathic characteristics might indeed be present in young children, suggesting a developmental approach to psychopathy. Moreover, the authors stress the importance of identifying different subtypes within antisocial and violent children. Accordingly, prevention and treatment strategies should take into account the different aetiologies of these subgroups. By doing so, treatment response in these difficult samples may improve. The authors are currently using imaging and cognitive genomics strategies to investigate these different subtypes. Finally, it is concluded that the integration of cognitive neuroscience and genetics will contribute to a better understanding of the concept of psychopathy as a developmental disorder (Jones & Viding, 2007).

Besides cognitive neuroscience and genetics, other biological variables have been argued to be associated with criminal behaviour. For instance, low stress reactivity (low levels of fear) is known to be related to criminal behaviour (e.g., Lykken 1957; Raine, 1993). Low stress reactivity can be measured by, for instance, the level of the stress hormone cortisol (Van Goozen, Matthys, Cohen-Kettenis, Buitelaar & Engeland, 2000). Individuals with low cortisol levels often fail to inhibit antisocial behaviour since they experience less feelings of discomfort when acting in a way that we know is not socially accepted. In the second article of this special issue, Popma, Vermeiren, Jansen and Doreleijers (2007) present recent findings from a series of studies on the relationship between antisocial behaviour and functioning of the hypothalamic-pituitary-adrenal axis (HPA axis). More specifically, they report several studies in adolescence. The results demonstrated that first, antisocial behaviour was not so much associated with a shift in basal cortisol levels, but in altered HPA reactivity. Second, in studies where HPA (re)activity was investigated as a response to a stressor, results supported the fearlessness theory (Raine, 1993), assuming low arousal levels to reflect low levels of fear. Third, there seems to be a positive association between testosterone levels and overt aggression when cortisol levels where low, but not when cortisol levels were high. The authors give several explanations for this interesting interaction. Finally, the authors report on an inverse association between dimensional scores of antisocial behaviour and cortisol levels during the cortisol awakening response, which suggests that the inverse association between HPA reactivity and antisocial behaviour extends from non-pathological levels of antisocial behaviour to pathological levels. Implications for diagnostic identification, treatment options and evaluations as well as relapse are discussed (Popma et al., 2007). Regarding the focus on the developmental aspect of criminal, psychopathic behaviour the first two articles corroborate on previous research suggesting biological factors to be related to antisocial behaviour in children and adolescents.

The next two articles have a more cognitive line of approach in which criminal psychopathic behaviour in adults is investigated. The first of these describes the relationship between psychopathy and violence. It has been repeatedly demonstrated that psychopathic offenders are often raised in violent situations, such as disrupted families, antisocial parents, and interparental violence (e.g., Farrington, 2005). Interestingly, research has demonstrated that psychopathic offenders are charged with violent crimes about twice as often as non-psychopaths (e.g., Hare & Jutai, 1983; Porter, Birt & Boer, 2001). Indeed, a large number of studies have shown that the presence of psychopathic traits is associated with a tendency for violent behaviour. In line with this, psychopathy is associated with increased violent recidivism (Gretton, McBride, Hare, O'Shaughnessy & Kumka, 2001). Therefore, the third article in this special issue focuses on the relationship between psychopathy and violence in adults. Walsh, Swogger, Walsh, and Kosson (2007) review the literature on this subject. The authors conclude that the relationship between psychopathy and violence is consistent across IQ and ethnicity, but is not consistent across levels of social economic status (SES). Higher SES seems to protect against violence in European-American psychopaths, but not among African-American psychopaths. In addition, they argue that both psychopathy as a whole as well as its subcomponents add specificity to our understanding of the relationship between psychopathy and violence (Walsh et al., 2007).

The pattern of high violence in psychopaths makes clear that psychopaths are a highly aggressive group of delinquents. An important issue in understanding violent behaviour is whether the performer acts in a defensive or an offensive style. In other words, the question whether someone acts in reaction to provocation, in an emotional situation, or rather, in a more volitional, predatory and instrumental way seems especially important in relation to psychopathy (Raine et al., 2006). Additionally, in line with research indicating that it is important to investigate psychopathy in terms of its subtypes (e.g., Walsh et al., 2007), in the fourth contribution Cima, Tonnaer and Lobbestael (2007) argue that the different categories of aggression compose distinct dimensions within psychopathy and are therefore differentially related to certain aspects of criminal behaviour, such as emotional processing deficits. More specifically, the authors investigated whether the impulsivity and predatory dimension within psychopathy was differentially related to a lack of moral emotions such as good and bad, and guilt and regret. The results demonstrated that the predatory dimension best predicted a lack of moral emotions of good and bad, while the general construct of psychopathy predicted a lack of guilt. The impulsive dimension was not specifically correlated with any of the measurements on moral cognitions. By investigating moral emotions and attentional biases in predatory and impulsive offenders, this study contributes to a better differentiation between diverse variations in psychopathy (Cima et al., 2007). Overall, regarding the focus on risk factors of psychopathic behaviour, these two articles stress the importance of different variations within psychopathic offenders.

In line with this, there are speculations about the relationship between different subtypes of psychopathic offenders and certain brain abnormalities (e.g., Walter, 2005). For instance, several studies have reported a relationship between antisocial characteristics and prefrontal volume deficits (e.g., Raine, Lencz, Bihrle, Lacasse & Colletti, 2000) while other studies have demonstrated the relationship between psychopathy and an underactivation of the amygdala (e.g., Kiehl et al., 2001). In another study the lack of fear component of psychopathy has been related to lower volumes of the posterior hippocampus (Laakso et al., 2001). However, there has been very little research on brain imaging, using fMRI on the specific construct of psychopathic behaviour. As a consequence, the discussion on the neuroanatomical basis of psychopathy based on imaging data is very limited. Therefore, in the fifth contribution to this special issue Yang and Raine (2007) review the literature on brain imaging research on antisocial and psychopathic violent behaviour. They argue that impairments in the frontal lobe circuit (i.e., ventral and lateral regions of the prefrontal cortex, superior temporal gyrus, amygdala-hippocampal complex, and the anterior cingulated cortex) may be associated with an antisocial personality disorder and psychopathy. Moreover, the authors hypothesise that these brain abnormalities include poor inhibition control, reward dominance, lack of remorse, fearlessness, shallow affect, and impaired moral judgement (Yang & Raine, 2007).

Since criminal behaviour seems to be an interplay between biological and situational factors, the question arises whether this type of behaviour can still be altered in adults. And focusing on the treatment of criminal psychopathic behaviour, can violence be treated? In the final contribution to this special issue, De Ruiter and Hildebrand (2007) give an overview of the current state of affairs in the area of treatment and risk assessment in forensic psychiatry. The authors state that effectiveness studies regarding treatment in forensic hospitals are sparse and consist largely of naturalistic pre-post designs. Until now, results do not look very promising. However, the authors describe some recently started innovative projects in this domain. They conclude that a lot of research, especially using randomised clinical trials, is needed to give more reliable insight into the effect of treatment in forensic patients. Moreover, to be able to achieve effective treatment programmes, risk management strategies should also be improved (De Ruiter & Hildebrand, 2007).

Conclusion

Criminal behaviour constitutes a very heterogeneous construct, including both biological and environmental factors. In order to understand this complex concept it is important to consider subcomponents or subtypes of violent behaviour. For instance, according to some authors (e.g., Jones & Viding, 2007) not identifying these subtypes may explain the low treatment response often reported in the literature (e.g., Harris & Rice, 2006; de Ruiter & Hildebrand, 2007). In line with this notion Walsh et al. (2007) have stressed the importance of dividing psychopathy into several subcomponents regarding the relationship with violence. In the study by Cima et al. (2007) it is was indeed demonstrated that distinct dimensions within psychopathy are differentially related to a lack of moral emotions. It may even be the case that these variations within criminal behaviour may relate to different brain dysfunctions. In the overview described by Yang and Raine (2007), it does indeed seem that several brain areas are involved in antisocial, psychopathic behaviour. Some regions are involved in decision-making processes and executive functioning, while others are related to social cognition, emotional processing and recollecting of affective information (Yang & Raine, 2007). These findings all seem to support the notion of different variations within psychopathic anti-

social offenders. Furthermore, regarding the association between criminal behaviour and the brain, the literature has reported contrasting results. For instance, in a study by Intrator et al. (1997) psychopathy was related to an increased frontotemporal perfusion, whereas in the study by Soderstrom, Hultin, Tullberg, Wikkelso, Ekholm and Forsman, (2002) psychopathy was negatively related to frontotemporal perfusion. Additionally, two studies have shown diminished activation of the amygdala (Kiehl et al., 2001; Veit et al., 2001), while two other studies demonstrated increased activation (Muller et al., 2003; Schneider, Habel, Kessler, Posse, Grodd & Müller-Gartner, 2000). In line with the impression of psychopathy as a diverse concept, an interesting hypothesis might be that these discrepancies may be related to different subtypes within the concept of antisocial, psychopathic offenders. Future research is needed to investigate this issue in more detail.

Since so much research underlines the importance of biological vulnerabilities in relation to criminal behaviour, the question arises whether we are all victims of our brain or biological make-up. An intriguing question is whether we are born with these abnormalities that lead to criminal behaviour. This fascinating issue has no straightforward answer. It seems that although biological factors play an important role in the development of antisocial, psychopathic behaviour, treatment might still influence these processes. Biological dysfunctions are not equivalent to aetiology or hereditary, nor does this mean such deficits are unchangeable or unverifiable (e.g., Walter, 2005). Accordingly, non-pharmacological interventions can change cortisol levels before and after treatment (see Popma et al., 2007). Research has also documented that brain abnormalities can be changed after non-pharmacological interventions. For instance in a study described by Arntz and Bernstein (2006), responsivity of certain brain regions (i.e., amygdale and hippocampus) to emotional stimuli was reduced in treated patients, but not in non-treated patients.

Consequently, biological factors can give us some insights into understanding the vulnerabilities of the development of criminal behaviour, while cognitive aspects can give direction to points of action for treatment focus (e.g., Cima et al., 2007). It seems very important that treatment starts at a very young age. The more we change at an early age, the more influence it seems to have on the biological vulnerabilities (e.g., Jones & Viding, 2007). According to these authors, intervention programmes can sometimes have mixed results regarding their success due to aetiologically heterogeneous samples. This heterogeneity is reflected in both cognitive neuroscience as well as in genetic make-up (Jones & Viding). Therefore, treatment should be more oriented towards prevention programmes. In other words, preventing criminal behaviour from manifesting itself in young children can overcome the problem of disruptive behaviours later on in life.

Of course, this special issue has some limitations. First, within the broad spectrum of issues concerning forensic psychology, we have chosen to focus on psychopathic behaviour. Obviously, this approach ignores many interesting avenues of forensic psychology. Second, it would have been preferable to describe the developmental aspects, risk factors, and treatment evaluation regarding criminal behaviour from both a biological and a cognitive line of approach. Since a maximum of six articles could be included in this special issue, this leads to a certain selection bias. More specifically, the developmental aspect of psychopathic, criminal behaviour is mainly described from a biological point of view, while risk factors and treatment are primarily explained using a more cognitive approach.

In sum, by identifying different dimensions or subtypes of antisocial, violent behaviour we will improve our understanding of the aetiology, characteristics, and treatment outcome in relation to antisocial, psychopathic behaviour. Moreover, by identifying several dimensions within psychopathic behaviour, the effect of early prevention programmes may increase. We intended to give an interesting view of a specific concept within forensic psychology, thereby attending to new progress or insights into the development, risk factors and treatment of criminal behaviour in both children and adults. Are we a victim of our brain? There is no straightforward answer and a great deal of research in forensic psychology is still needed.

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