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Visual attention in violent offenders: Susceptibility to distraction

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ABSTRACT

Impairments in executive functioning give rise to reduced control of behavior and impulses, and are therefore a risk factor for violence and criminal behavior. However, the contribution of specific underlying processes remains unclear. A crucial element of executive functioning, and essential for cognitive control and goal-directed behavior, is visual attention. To further elucidate the importance of attentional functioning in the general offender population, we employed an attentional capture task to measure visual attention. We expected offenders to have impaired visual attention, as revealed by increased attentional capture, compared to healthy controls. When comparing the performance of 62 offenders to 69 healthy community controls, we found our hypothesis to be partly confirmed. Offenders were more accurate overall, more accurate in the absence of distracting information, suggesting superior attention. In the presence of distracting information offenders were significantly less accurate compared to when no distracting information was present. Together, these findings indicate that violent offenders may have superior attention, yet worse control over attention. As such, violent offenders may have trouble adjusting to unexpected, irrelevant stimuli, which may relate to failures in self-regulation and inhibitory control.

1. Introduction

The quest for neuropsychological markers and predictors of violent behavior is ongoing. While important leads have emerged, it remains unclear which factors uniquely predict violence and violent recidivism. Violent offenders appear to have reduced control over behavior and impulses (Blair, 2001; Rogers, 2003) and are diagnosed with disorders that are characterized by this lack of control (Harris et al., 1993; Schroeder et al., 2013). In this light, the role of executive functioning in the general offender population has been extensively investigated (Morgan and Lilienfield, 2000; Ogilvie et al., 2011). Impairments in executive functioning are related to aggressive, antisocial behavior and impulsivity, to decreased self-control, socially inappropriate behavior and impairments in the ability to respond to punishment and reward (Morgan and Lilienfield, 2000; Ogilvie et al., 2011; Rogers, 2003; Seres et al., 2009). Deficits in behavioral control are reflected in poor performance on various executive measures of neuropsychological functioning (Meijers et al., 2015; Ogilvie et al., 2011), such as the Iowa Gambling task (Beszterczey et al., 2013). As such, impairments in executive functioning may increase the risk of antisocial behavior (De Brito et al., 2013; Ogilvie et al., 2011; Hoppenbrouwers et al., 2013).

Clarification of the contribution of specific neuropsychological factors may help better understand the risk for future antisocial behavior. As such, it is important to further disentangle different cognitive processes that are represented within executive functioning. Attention is a crucial element of executive functioning and is essential for cognitive control and goal-directed behavior (Hofmann et al., 2012). In fact, attention (together with (spatial) working memory) appears to have a strong relation to antisocial behavior (Ogilvie et al., 2011). The identification and selection of information in the visual environment is important to be able to act in a goal-directed manner (Theeuwes, 1993). As such, visual attention is important in processing information, and helps focus on relevant information, while ignoring information that is irrelevant (Theeuwes, 1992). This selection of information occurs in different ways. Traditionally, a distinction is made between bottom-up and top-down visual attention. For bottom-

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up attention, information is selected based on the physical salience of environmental stimuli, which may lead to involuntary attentional capture. Top-down attention pertains to the processing of information based on current goals. In general, it is presumed that various stimuli compete for attentional selection (Theeuwes, 1993).

An offender group that has been heavily researched in terms of attention is that of psychopathic offenders. Psychopathic offenders are characterized by chronic antisocial behavior and attitudes (e.g., irresponsibility, irritability, impulsivity (Hoppenbrouwers et al., 2015a)), in combination with interpersonal and affective personality traits, (e.g., a deceitful interpersonal style, callousness, emotional superficiality, lack of empathy) (Hare, 2003). The latter characteristics have been associated with superior selective attention whereas the impulsive and antisocial lifestyle is related to worse attentional performance (Baskin-Sommers et al., 2011, 2012). This has been explained by the response modulation theory that states that psychopathic individuals have difficulty adjusting their behavior once goal-directed behavior is initiated (Newman and Baskin-Sommers, 2011; Wallace et al., 1999; Baskin-Sommers et al., 2011, 2012; Wolf et al., 2012).

With exception of the specific subgroup of psychopathic offenders, research on attention in offenders is limited. Offenders have problems in attentional set-shifting (Bergvall et al., 2001; Dolan and Park, 2002; Dolan, 2012) and antisocial offenders show a stronger attentional bias toward violence related words (Domes et al., 2013). On the other hand, attentional problems may vary for subtypes of offenders; affective/ impulsive murderers perform poorer on different measures of attention compared to predatory/ planning murderers (Hanlon et al., 2013). Taken together, these studies show impairments in attentional functioning in offenders. However, different subgroups are included, or different measures of attention are used, which involve emotional stimuli or more complex processes (shifting). Therefore, the exact underlying problem remains obscure with visual attention not being investigated in violent offenders in general.

As knowledge regarding the role of attentional control in offenders is limited, we used a well-known attentional task to determine attentional functioning in violent offenders. Since problems in executive functioning (including attention) are mainly related to criminal behavior in general and not to specific disorders (Morgan and Lilienfeld, 2000; Rogers, 2003), we chose to focus on the population of violent offenders and not include specific subgroups in terms of diagnoses or specific offenses.

A group of offenders residing in Dutch forensic hospitals and a control group of healthy controls were compared on an additional singleton paradigm, to determine the interaction between bottom-up and top-down control of visual attention. In this task, participants are required to search for a unique shape (e.g., a diamond) among similarly colored but differently shaped elements (e.g., circles). In a subset of trials, one of the task-irrelevant elements had a different color, thereby briefly capturing attention (Theeuwes, 1992). Attentional capture by task-irrelevant stimuli is a measure of the influence that stimulus driven (bottom-up) attention has on goal directed (top-down) attention. Based on the literature reviewed above, we expected to find that offenders would be more prone to distraction (i.e., increased attentional capture) compared to healthy controls.

2. Methods

2.1. Participants

We recruited 62 offenders from 3 Dutch forensic psychiatric hospitals and 69 healthy controls from the community. With regards to the offender group, offenses included (serial) rape, (serial) murder, manslaughter, theft, breaking and entering, kidnap, grand larceny, extortion, (aggravated) assault and robbery. All offenders were currently incarcerated for a violent offense with a minimum sentence of at least 4 years under Dutch law. In The Netherlands, one can only be admitted to such a hospital after committing a violent offense. For this reason we opted to name the offender population 'violent offenders'. All participants had normal or corrected to normal vision. Exclusion criteria were comorbid neurological disorders, (e.g., epilepsy), psychotic disorders, bipolar disorder or color blindness.

Table 1
Demographic variables.

	Offenders M (SD)	Controls M (SD)
Age	46.48 (11.25) (n= 52)	30.72 (10.31) (n= 60)
IQ	95.21 (13.73) (n= 43)	107.38 (13.73) (n= 58)
Psychotropic medication	22.56% (n=43)	0%

In total 18 participants were excluded from the original 131 participants. In the analyses, 113 participants were included, 53 offenders and 60 controls. Three offenders were excluded from the analysis because they turned out to be colorblind or have other vision problems. Three participants (1 offender and 2 controls) were excluded because the data was not usable due to computer malfunction. Two participants (1 offender and 1 control) opted to quit the experiment. Two participants (1 offender and 1 control) did not perform the task correctly. One participant in the control group had had a severe accident in the past with loss of conscience. Finally, 7 participants (4 controls and 3 offenders) were excluded due to poor accuracy rates(< 75%).

The age of the participants ranged from 19 to 68 years (M=38.04, SD =13.03). The average age of the offenders is significantly higher than the age of the control group (see Table 1) (t=7.737; p < .01). The total IQ-scores were lower for offenders (see Table 1). An independent samples t-test indicated a significant difference in mean IQ-scores (t=4.252, p < .01). For 43 offenders (81.1%), information was available about the use of medication. 22.56% of this group used psychotropic medication.

2.2. Procedure

Offenders who were interested in participating were asked to sign a permission form for the release of file information. Next, a review of psychological and medical files was performed. When the file review indicated that offenders were generally eligible, they were contacted and the study was explained to them again. When they agreed to participate, they signed the informed consent and were enrolled in the study. Data concerning socio-demographic information, medication and psychological and medical information were gathered in the medical and psychological files of the offenders.

The control group was recruited from the community using (online) advertisements in different regions of the Netherlands, mostly Amsterdam. All participants were informed about the study orally and in writing.

The healthy controls were screened for neurological and psychiatric disorders, addiction and medication use, through a standard interview. After confirmed eligibility, an appointment was made for conducting the tasks. Upon arrival, participants signed an informed consent form. All participants received a financial compensation of €7.50. For offenders, the compensation was transferred to the hospital, which paid it to the offender.

All participants were explicitly instructed that they could terminate enrollment in the study at any moment without giving a reason for doing so. Well-trained and certified psychologists or psychological test assistants administered all tests.The study was approved by the local ethics committee and was in line with the declaration of Helsinki ("WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects," 2013).