

# The thrill of being violent as an antidote to posttraumatic stress disorder in Rwandese genocide perpetrators

Roland Weierstall<sup>1\*</sup>, Susanne Schaal<sup>1</sup>, Inga Schalinski<sup>1</sup>,  
Jean-Pierre Dusingizemungu<sup>2</sup> and Thomas Elbert<sup>1</sup>

<sup>1</sup>Department of Psychology, University of Konstanz, Konstanz, Baden-Wuerttemberg, Germany; <sup>2</sup>Department of Psychology, University of Butare, Butare, Rwanda

**Background:** The cumulative exposure to life-threatening events increases the risk for posttraumatic stress disorder (PTSD). However, over the course of evolutionary adaptation, intra-species killing may have also evolved as an inborn strategy leading to greater reproductive success. Assuming that homicide has evolved as a profitable strategy in humans, a protective mechanism must prevent the perpetrator from getting traumatised by self-initiated violent acts.

**Objective:** We thus postulate an inverse relation between a person's propensity toward violence and PTSD.

**Method:** We surveyed a sample of 269 Rwandan prisoners who were accused or convicted for crimes related to the 1994 genocide. In structured interviews we assessed traumatic event types, types of crimes committed, the person's appetitive violence experience with the Appetitive Aggression Scale (AAS) and PTSD symptom severity with the PSS-I.

**Results:** Using path-analysis, we found a dose-response effect between the exposure to traumatic events and the PTSD symptom severity (PSS-I). Moreover, participants who had reported that they committed more types of crimes demonstrated a higher AAS score. In turn, higher AAS scores predicted lower PTSD symptom severity scores.

**Conclusions:** This study provides first empirical support that the victim's struggling can be an essential rewarding cue for perpetrators. The results also suggest that an appetitive aggression can inhibit PTSD and trauma-related symptoms in perpetrators and prevent perpetrators from getting traumatised by their own atrocities.

Keywords: *genocide; perpetrator; aggression; posttraumatic stress disorder*

For the abstract or full text in other languages, please see Supplementary files under Reading Tools online

Received: 10 February 2011; Revised: 23 June 2011; Accepted: 1 July 2011; Published: 25 November 2011

Human beings from time immemorial have eradicated neighbouring tribes, languages, religions, and cultures. The Holocaust and the Bosnian genocide are recent reminders for Europe. In the Rwandan genocide of 1994, approximately 800,000 to 1 million humans were violently killed within 100 days. Any such mass crime requires careful planning and efficient organisation; that is, there must be a motivation and potential reward months or even years in advance for people to become involved in plotting strategies for the

mass killings. Nelson and Trainor (2007) suggest that such undertakings “may be rooted in more instrumental mechanisms of aggression.” Traditionally, there are two different kinds of aggression, the goal-directed *instrumental aggression* and the *hostile or reactive aggression*. The latter is considered as reactive behaviour to counter an imminent danger or threat (e.g., Buss, 1961; Feshbach, 1964; Hartup, 1974). In contrast to the reactive act, instrumental aggressive behaviour is often prompted by its anticipated benefit, like in mating (Buss,

2000; Weekes-Shackelford, Shackelford, & Buss, 2003), status (Daly & Wilson, 1996; Shackelford, 2005), or access to resources (Daly & Wilson, 1988; Kruger & Nesse, 2004), including social status. Homicide, therefore, may result from such reward anticipation. Over the course of evolutionary adaptation, however, it may have also evolved as an inborn strategy leading to greater reproductive success (Daly & Wilson, 1988, Duntley & Buss, 2005). Reviewing the literature, Jones (2008) concluded that “evolution may have favoured those who go to war” and that a “moral sense” developed to control the expression of violence, as intergroup violence has always accompanied the evolution of mankind (Kelly, 2005).

The logical consequence of this view would be that violence itself—violent cues and violent acts—may have appetitive components for the perpetrator (Nell, 2006). We argue further that this appeal of violence may serve as a protecting factor for trauma-related disorders such as posttraumatic stress disorder (PTSD) as it prevents extension of the fear network. Research repeatedly has demonstrated the significant relationship between the number of traumatic-event types experienced and the likelihood of developing PTSD and other disorders of the trauma spectrum: the greater the exposure to trauma, the greater the fear network (Elbert, Rockstroh, Kolassa, Schauer, & Neuner, 2006) and, thus, the more likely the development of psychopathology (Allwood, Bell-Dolan, & Husain, 2002; Elbert et al., 2009; Kolassa & Elbert, 2007; Neuner et al., 2004; Schaal & Elbert, 2006; Schauer et al., 2003; Steel, Silove, Phan, & Bauman, 2002). In war and crisis, the cumulative exposure to traumatic stress constitutes a predictor of endemic mental illness. This effect of cumulative exposure makes combatants vulnerable, as they are exposed to a great number and outstanding diversity of traumatic stressors. Why then does it not produce widespread mental suffering in perpetrators of severe atrocities? Obviously, there must be a protective mechanism that counters the extension of the fear network that would be expected to occur with each additional life-threatening experience or the exposure to violence cues (see also Elbert, Weierstall, & Schauer, 2010). In the present study we tested our suggestion that in a perpetrator these experiences will be associated with positive events, preventing their integration in the network related to fear and horror. Nell (2006) outlined the rewarding effects of cruelty. He proposed an affectively positive, dopamine mediated and, therefore, rewarding perception of violence, which would be responsible for enjoying violent behaviours from the passive pleasure of consuming media violence to the thrill of severe abuse. If an appetitive instead of an aversive perception of violence cues prevents trauma-related mental illness in the perpetrator, then we should see corresponding negative correlations between

PTSD-related symptoms and indices of instrumental aggression. We tested this hypothesis in the present study.

We surveyed Rwandese prisoners that were all sentenced or accused for crimes related to the 1994 genocide. We hypothesised that participants who rated harming others as more positive would show fewer and less severe symptoms of PTSD when the cumulative exposure to traumatic stress was controlled for. Moreover, we assumed that the mere exposure to self-committed violence would breed violence-related enjoyment. We defined *appetitive aggression* as a behaviour directed to inflict harm to another person in order to obtain the rewarding effects from violence-related cues. Appetitive aggression was assessed using the Appetitive Aggression Scale (AAS, Weierstall & Elbert, 2011). Moreover, if manhunts primarily appeal to men (Nell, 2006; Wood & Eagly, 2002), we would expect more pleasure of violence in male than female participants.

## Method

### Settings and procedure

The present study was part of a research project focussing on mental health in Rwandese prisoners (Schaal, Weierstall, Dusingizemungu, & Elbert, 2011). The data were collected in the prisons of Butare and Kigali, Rwanda with the permissions of the Ministry of Science and Technology and the Ministry of Internal Security/Rwanda Prisons Service, Rwanda, who also guaranteed strict confidentiality. To provide privacy and confidentiality to the participants, interviews were carried out in separate rooms inside the prisons with no attendance of any prison staff. Structured interviews were carried out during February and March 2009. Participants were interviewed by 5 clinical psychologists from the University of Konstanz with support from local interpreters, trained in the concepts of trauma and aggression, as well as 10 clinical psychologists from the University of Butare who were experts in trauma-spectrum disorders and who had received training and extensive experience in performing structured clinical interviews in earlier studies (e.g., Schaal, Elbert, & Neuner, 2009).

### Instruments

We assessed PTSD symptom severity with the PSS-I (Foa & Tolin, 2000) that is based on *DSM-IV* and assesses the frequency of PTSD symptoms in the past 2 weeks. The assessment of PTSD symptoms in structured interviews has been successfully validated in different populations in sub-Saharan Africa as well as with Rwandese genocide survivors (e.g., Eckart et al., 2009; Schaal & Elbert, 2006). The PDS event scale (Foa, 1995) was modified according to the range of traumatic stressors in the context of the Rwandan genocide and included 26 different event types. We further distinguished between

the 16 items that dealt with self-experienced traumatic events and the 10 items that dealt with witnessed event types. A traumatic event type was judged as *self-experienced* if the participant was the victim and as *witnessed* if the participant has seen or heard the traumatic event while someone else was threatened. For the analyses, the number of traumatic event types was summed up to a self-experienced event types sum score and a witnessed event types sum score. For the self-committed violence, we systematically assessed 15 different types of genocide-related delict types (e.g., mutilation, rape, or killing) that were summed up to a committed delict type sum score.

To assess appetitive violence experiences we used the Appetitive Aggression Scale (AAS), a semi-structured interview that has also been used and validated in other comparable populations (Weierstall & Elbert, in press). The questionnaire includes statements that have to be rated as either true or not true. Responses to all items were given on a 5-point Likert scale ranging from 0 (“I totally disagree”) to 4 (“I totally agree”). For the analysis, a sum score was calculated. The interviewers probed the statements prior to the rating to assure that participants gave their ratings according to their own perception of violence during genocide, and that they correctly understood the meaning of the given statements. Items were based on the subtypes of aggression according to Vitiello and Stoff (1997), the *ICD-10* criteria for defining as well as on perpetrators’ reports about the pleasure of violence from the clinical practice.

Prior to the administration of our study protocol, all questionnaires were translated into Kinyarwanda and then back into English by the local interpreters. Translations were then discussed with the clinical psychologist from Butare and Konstanz to guarantee the valid assessment of trauma symptoms and appetitive violence experience.

### Participants

Participants were 269 Rwandese prisoners who were all imprisoned because of crimes related to the Rwandan

genocide in 1994. All participants completed the interview and no one refused to participate. Twenty-two participants were still held pending trial, while the other prisoners were either convicted by a Gacaca or a governmental court. They stayed in the prisons a median of 5 years with a range of 0 to 15 years. There were 150 participants interviewed in the prison of Butare and 119 in the prison of Kigali. All participants were above the age of 18 at the time of genocide ( $M = 33$  years,  $SD = 10$  years). Thirty-four percent (92) of the sample were women and 66% (177) were men. The participants reported between 0 and 9 committed delict types ( $M = 2.23$ ,  $SD = 1.90$ ), 1 to 11 different self-experienced traumatic event types ( $M = 4.67$ ,  $SD = 2.45$ ), 0 to 8 different witnessed traumatic event types ( $M = 2.97$ ,  $SD = 1.85$ ), and a PSS-I sum score between 0 and 37 points ( $M = 6.06$ ,  $SD = 7.7$ ). (For further details on mental health in Rwandese prisoners, see Schaal et al., 2010.) Of the prisoners, 15.6% had a life sentence, while the rest of the participants had mean sentences of 18.1 years ( $SD = 8.2$  years). The AAS scores ranged from 0 to 51 points ( $M = 15.42$ ,  $SD = 10.50$ ). The Ethical Review Board of the University of Konstanz approved the study. The procedure was explained to all participants in advance and they all gave written consent to participate. They were informed that the study was conducted to get a better understanding of their experiences of violent and traumatic events that have happened during the genocide and how they are affected by their experiences currently. Participants received no financial compensation.

## Results

### Measuring appetitive aggression

Table 1 gives an overview of the distribution of responses to the items in the Appetitive Aggression Scale, ranked according to the degree of agreement with the given statements. While a great number of items corresponded with the perception of violence in many perpetrators, other items were only appropriate for a minority.

**Table 1.** Means, standard deviations and correlations for the number of self-experienced and witnessed traumatic event types, delict types committed, and PTSD symptom severity with the AAS score

	Number of event types self-experienced	Number of event types witnessed	Delict types committed	PTSD symptom severity
Mean	5.05	3.51	2.06	6.06
Standard deviation	2.46	1.86	1.84	7.7
Correlation with appetitive violence experience	.17*** ( $n = 265$ )	.28** ( $n = 264$ )	.30** ( $n = 264$ )	-.01 ( $n = 265$ )

\*\* Correlation is significant at the .001 level (two-tailed).

Given that it is generally assumed that hunting is a prime domain of men, we performed chi-square tests to compare the frequency distributions between males and females. Significant differences were observed for most of the items, showing a higher degree of instrumental aggression in male participants. Correspondingly, we observed higher AAS score in male ( $M = 16.85$ ,  $SD = 11.10$ ) than in female participants ( $M = 9.89$ ,  $SD = 9.15$ ),  $t_{262} = 5.47$ ,  $p_{rep} > .99$ ,  $d = .73$ . We found that participants who were in prison longer had higher AAS scores even when controlled for the number of types of committed crimes ( $r_p = .20$ ,  $p_{rep} > .99$ ). Those who were in prison longer also reported lower trauma symptoms; that is, had lower PSS-I scores when controlled for the number of types of traumatic events experienced ( $r_p = -.16$ ,  $p_{rep} > .95$ ). Thus, a longer time spent outside prison and inside society was associated with less pleasure in violent acts and a greater likelihood for trauma-related illness, irrespectively of types of committed crimes and exposure to traumatic stressors. There was no difference in the appetitive violence score between those participants still held pending trial and those who had already been sentenced (Mann-Whitney  $U$ -test:  $z = 1.58$ ,  $p = .115$ ,  $r = .10$ ).

**Is attraction to kill associated with resilience to trauma-related mental symptoms?**

We expected that cumulative exposure to violence cues would add to the pleasure of violence and reduce trauma symptom severity. Table 2 shows the correlations for the number of traumatic event types witnessed and self-experienced, delict types committed, and PTSD symptom severity AAS scores.

To further examine our specific hypotheses, we conducted a path analysis using AMOS 19 for SPSS. For model construction, we investigated in a first step – which variables would best predict appetitive aggression in a linear model. Akaike information criterion (AIC, see Akaike, 1987) was lowest in a model that included committed delict types and witnessed event types, while all beta coefficients were statistically significant at  $p < .001$ . Self-experienced event types did not improve AIC. In a second step, we assessed which of the variables would predict PTSD symptom severity experience best. The AIC revealed that self-experienced and witnessed event types as well as AAS scores but not committed delict types were included in the model with the lowest AIC. All beta coefficients were statistically significant at  $p < .001$ . In combination of these two results, we tested a

**Table 2.** Percentage of agreements for the statements in the AAS for the assessment of appetitive aggression

Item with rank	Total sample			“Agree” responses only	
	“Agree”	“Neither nor”	“Disagree”	Males	Females
1. Once fighting has started, do you get carried away by the violence?	50.6	12.6	36.8	61.0	30.4***
2. Is defeating the opponent more fun for you, when you see them bleed?	49.4	11.5	39.0	54.2	40.2*
3. Once you got used to being cruel, did you want to be crueller and crueller?	27.5	17.1	55.4	36.7	9.8***
4. Do you feel powerful when you go to a fight?	24.5	10.8	64.7	31.1	12.0***
5. Is fighting the only thing you want to do in life?	18.2	12.6	69.1	21.5	12.0*
6. Is it exciting for you if you make an opponent really suffer?	16.4	5.6	78.7	19.8	9.8*
7. Does the challenge of defeating a strong opponent make the fight more pleasurable for you in comparison to the defeat of a weak opponent?	16.0	6.7	77.2	20.9	6.5**
8. Do you like to listen to other people telling you stories of how they killed others?	15.0	4.1	18.9	18.6	7.7**
9. When you fight, do you stop caring about whether you could be killed?	14.1	3.3	82.5	17.5	7.6*
10. Do you know what it is like to feel the hunger/thirst to fight?	13.4	3.7	82.9	17.5	5.4**
11. During fighting does the desire to hunt or kill take control of you?	13.4	1.9	84.8	16.9	6.5
12. Did you harm others, just because you wanted to, without having a reason/order?	10.0	4.8	85.1	13.0	4.3*
13. Do you enjoy inciting your fellows to fight?	8.9	1.1	90.0	9.6	7.6
14. Is it fun to prepare yourself for fighting?	8.2	5.9	85.9	9.6	5.4
15. Can attacking humans be sexually arousing for you?	3.3	6.0	90.7	4.0	2.2

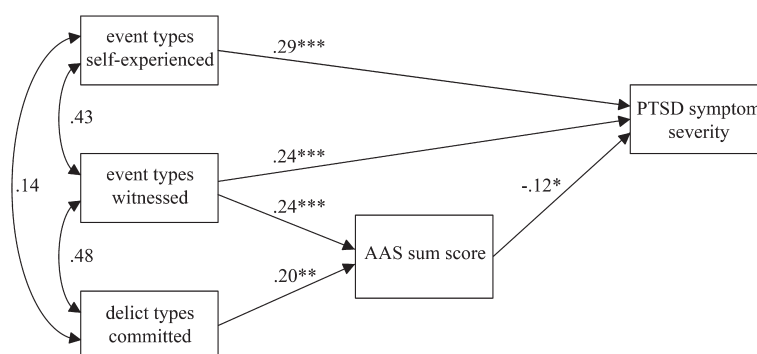
Note. For the clearer representation of the data, the two response categories “strongly agree” and “agree” were merged into “agree” as well as “strongly disagree” and “disagree” into “disagree.” For each item, chi-square tests were used to compare the frequency distribution among men and women. Asterisks indicate statistical significance \* $p < .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

model with indirect paths from witnessed traumatic event types and committed types of crime through appetitive aggression to trauma symptom severity, as well as direct paths from self-experienced and witnessed traumatic event types to PTSD symptom severity (Fig. 1). According to the criteria for a good-fitting model and the combinatorial rules to reduce type I and type II errors (Hu & Bentler, 1999), our proposed model fitted the data,  $\chi^2(2) = 1.06$ ,  $p = .59$ ,  $\chi^2/df = .50$ , comparative fit index (CFI) = 1.00, root-mean-square error of approximation (RMSEA) = .00.

Participants who had reported that they witnessed more violent events and committed more types of crimes demonstrated a higher AAS score. In turn, higher AAS scores predicted lower PTSD symptom severity. However, it is noteworthy that an equivalent model specifying a reversed path from PTSD symptom severity to appetitive violence experience would fit the data too ( $\chi^2(2) = 2.56$ ,  $p = .278$ ,  $\chi^2/df = 1.28$ , CFI = 1.00, RMSEA = .00). But such a model may be disregarded as a necessary consequence of path analysis (see MacCallum & Austin, 2000), as the AAS asks for the experience of violence throughout the life span, whereas the PSS-I asks for the current symptom status in the last 2 weeks.

### Gender effects

As described earlier, we found a gender difference, indicating that violence-related enjoyment is more pronounced in men. It therefore needs to be assured that the proposed model is not merely driven by gender differences, with women being less aggressive and more severely traumatised than men. We did not find significant gender differences in PTSD symptom severity,  $t_{262} = 0.31$ ,  $p_{rep} = 0.32$ ,  $d = 0.04$ . Moreover, the proposed model matches both sexes ( $\chi^2(4) = 1.93$ ,  $p = .75$ ,  $\chi^2/df = .48$ , CFI = 1.00, RMSEA = .00). Therefore, even though women reported lower appetitive violence experience than men, the model holds irrespectively of gender.



**Fig. 1.** Path model of the relationship among the number of self-experienced as well as witnessed event types, number of different types of crimes, AAS score and PSS-I sum-score. Standardized regression weights are shown. Asterisks indicate statistical significance of the regression weights \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

### Potential impact of prison's location and interviewers

A  $2 \times 2$  mixed design ANOVA with the prison's location (Butare vs. Kigali) and expert (Rwanda vs. Konstanz) as between subject factors revealed a main effect for the prison's location, indicating that AAS scores were lower in Butare ( $M = 13.2$ ,  $SD = 9$ ) than in Kigali ( $M = 18.2$ ,  $SD = 10.9$ ),  $F(1, 262) = 37.47$ ,  $p_{rep} > .99$ ,  $\eta^2 = .13$ . Moreover, there was a main effect for the factor expert,  $F(1, 262) = 41.88$ ,  $p_{rep} > .99$ ,  $\eta^2 = .14$ . AAS scores were lower when Rwandese experts performed the interviews ( $M = 13.9$ ,  $SD = 9.8$ ) than when experts from Konstanz did so ( $M = 20.2$ ,  $SD = 11.3$ ). The interaction of the expert with the location reached significance ( $F(1, 262) = 8.70$ ,  $p_{rep} > .98$ ,  $\eta^2 = .032$ ) indicating that participants were especially open in Kigali when experts from Konstanz performed the interviews. However, the more important finding is that the path model still fits for all four groups in a simultaneous equation model ( $\chi^2(8) = 4.60$ ,  $p = .80$ ,  $\chi^2/df = .57$ , CFI = 0.99, RMSEA = .03). For the interpretation of the location effect, we also calculated the difference in the number of delict types committed. We found that participants in the prison of Kigali not only had higher appetitive violence scores but also reported a significantly higher number of delicts committed (Mann-Whitney  $U$ -test:  $z = 2.01$ ,  $p = .044$ ,  $r = 0.12$ ).

### Discussion

This study examined the effect of a rewarding perception of violence as a preventative factor for PTSD symptom severity. We hence assessed a person's propensity towards violence with the Appetitive Aggression Scale. The current findings suggest that violence cues themselves can indeed be rewarding and that the struggling of a victim can reinforce aggressive behaviour. These results support the hypothesis of Nell (2006) that humans may enjoy cruelty, when moral restrictions do not prevent or even command organised violence. Moreover, we found that men rated violent acts more positively, an observation that has been predicted by Nell's evolutionary perspective that in humans, other than animal predators,

male exemplars have a stronger genetically prepared hunting disposition. In this context, it is interesting to note that the rapid evolution of the Y-chromosome is unparalleled for the rest of the genome (Hughes et al., 2010) indicating a gender-related speciation. To examine more complex relationships among the traumatic life experiences,

violence experiences from the perpetrator's perspective, traumatisation, and appetitive aggression, we conducted a path analysis that tested our hypothesis that protective mechanisms would prevent the perpetrator from getting traumatised by the cruelty from its own crimes and violent killing. Our analysis supported this hypothesis. Even though many perpetrators reported suffering from trauma symptoms, the symptoms were less severe or absent in those that had committed more crimes as indicated by the indirect effect of committed crimes to the PSS-I symptom severity score.

Furthermore, we observed an effect of the interviewer and prison's location on AAS score. These results may be explained by the assumption that participants in Rwanda's capital Kigali were more involved in the genocide than those from the more rural Butare prison, as participants from the prison of Kigali also reported more different delict types committed, although similar prisoner population are detained in both prisons. Alternatively, it could be argued that participants in Kigali more readily disclosed their views in relation to violence, as more non-governmental organisations (NGOs) have worked in the Kigali prison rather than in Butare. The difference between interviews performed by locals and experts confirms the statements provided by many participants, that they were not sure whether to trust local people as opposed to foreign interviewers. On the one hand, this implies the necessity to find implicit methods that complement the measure of aggression beyond trust and social desirability, especially when interviews are performed in former crisis regions. On the other hand, the model still fitted the data; that is, limited trust and honesty may offset the means but do not alter the correlations between measures.

### *Future implications for research on aggression*

The purposeful hunting of humans has been predominantly linked to pathological subjects, especially to psychopaths (Meloy, 1988; Serin, 1991; Williamson, Hare, & Wong, 1987). In contrast, when Hannah Arendt (1963) wrote about Eichmann, she talked about an ordinary bureaucrat and Stanley Milgram (1974) wrote about his participants "the ordinary person who shocked the victim did so . . . not from any peculiar aggressive tendencies" and claimed obedience was one of the main factors that made ordinary people behave cruelly. Estimates of the death toll during the Rwandan genocide suggest that as much as 10%–20% of the total population of the country was killed within 100 days (Des Forges, 1999). It is implausible to

assume that these perpetrators were mostly psychopaths, as in some regions the involvement of the vast majority of young men was needed to make the genocide happen. Scheper-Hughes (2003) argues from a theoretical point that "torturing and killing are as cultural as nursing the sick and the wounded" and that a variety of behaviours in everyday life can be a prerequisite for the occurrence of genocides. At present, besides theoretical publications, the hypothesis of rewarding and appetitive effects of violence in humans has not been tested systematically. This study is the first to present empirical evidence for a rewarding effect of cruelty and even suggests benefits for the mental health of perpetrators. On the basis of the results in this study, we would add that the fascination and reward of cruelty described by Nell (2006) could facilitate the outbreak of mass violence, when the moral barriers are removed or lowered. Further research is needed to detail and confirm the fascination and rewarding effects of violence and to uncover the underlying biological mechanisms that lead to perpetration. Moreover, the harming of the victim has not yet been defined as a primary goal of instrumental violence (Berkowitz, 1993; Geen, 2001). Rather, the anticipated benefits such as status or reproductive success (Weekes-Shackelford et al., 2003) has been linked to the development of aggressive behaviour. We postulate that a distinction has to be made between factors that contribute to overcoming moral restrictions, and the self-rewarding effects of violence observed in this study. This latter factor could maintain violence or even facilitate cruelty. Different psychological mechanisms linked to violent behaviour could have been crucial for the outbreak of the Rwandan genocide.

Prior to the Rwandan genocide, media propaganda systematically dehumanised the Tutsi and fuelled hatred in the Hutu population. Many Hutu were recruited by threat or incentives (Des Forges, 1999). Staub (2006) gives a comprehensive summary of how the paramilitary force Interahamwe recruited young men and turned ordinary people into killers. Consequently, the interplay between mechanisms described by social psychology and the proposed appetite for cruelty has to be considered, as societal problems often provide a starting point for the outbreak of group violence (Staub, 2001). Besides the aforementioned material benefits, social mechanisms like in- and out-group phenomena (Brewer & Campbell, 1976), obedience (Milgram, 1974), or emotional factors like anger (Anderson & Bushman, 2002) could have brought people to engage in the genocide and to overcome mechanisms that inhibit intra-species killing. Because a long lasting history of racist ideology intensified the separation of Hutu and Tutsi (Mamdani, 2002), feelings of revenge could have facilitated the outbreak of violence. Our results also show that committing violence and witnessing violence predicts the enjoyment of cruelty. This phenomenon is in line with a vicious circle of violence

(Elbert et al., 2006): That violence breeds violence and that a violent environment facilitates the outbreak of violence in ordinary people. However, our study results could show that appetitive violence experience is a protective mechanism for the development of PTSD symptoms. Thus, although other factors could have motivated people to engage in the genocide, this does not influence our main findings. Future studies are required to further investigate people's initial motives for engaging in violent behaviour and changes in the rewarding mechanisms. It is particularly important to examine the interplay between psychological and social factors, and to disentangle the initial motives for engaging in atrocities. Determining the point at which violence becomes self-rewarding is also another vital facet of research in this area.

### Future implications for research on PTSD

As many prisoners in Rwanda have been released since the end of genocide while others were accused of genocide crimes years later (Paul, 2006), it has to be taken into account that the time spent in society after the genocide could also have an impact on traumatised and the perception of violence. Our data supports the idea of a *perpetrator mode* due to the finding that participants who had spent more time in society after the genocide and before their arrest had lower instrumental aggression scores but higher trauma symptom severity. In a further step it could be discussed whether in these samples PTSD results in a mismatch between the appetitive experiences of violence and its rejection in society when returning from manhunt, which detaches the fear network from the protective characteristics of being in such a mode (Elbert et al., 2010). Further research is needed to understand an altered perception of violence when it is committed from the perpetrator's perspective.

### Limitations

This study provides first evidence for a protective mechanism that prevents PTSD symptom severity in Rwandese prisoners. However, future research has to investigate to which extent this result can be generalised to different populations of perpetrators. Moreover, the validity of responses from inmates in prisons may be questioned. However, a general offset of the data would not have necessarily affected correlations and the path-model. In addition, one could argue that those perpetrators who enjoy violence most may not reply truthfully on questionnaires. Asking explicitly if it is, for example, exciting to harm others could be susceptible to social desirability. Again, such a bias might have diminished the observed effect but could not have produced it. Finally, the retrospective nature of our study protocol may have a predisposed recall bias.

### Conclusion

The present investigation indicates the importance of empirically studying the theoretical construct of a genetically prepared predisposition for appetitive aggression fostered by potentially inherently rewarding properties of violent cues. Path analyses suggest that a positive rating of committing violent acts inhibits PTSD and trauma-related symptoms in perpetrators.

### Acknowledgements

The support of the National Commission for the Fight Against Genocide, Rwanda is gratefully acknowledged. We thank the prison staff in Butare and Kigali for their support. We also thank all local experts and interpreters and Heike Riedke for help with data collection.

### Conflict of interest and funding

There is no conflict of interest in the present study for any of the authors.

### References

- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52(3), 317–332.
- Allwood, M. A., Bell-Dolan, D., & Husain, S. A. (2002). Children's trauma and adjustment reactions to violent and nonviolent war experiences. *Journal of the American Academy of Child & Adolescent Psychiatry*, 41, 450–457.
- Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 53, 27–51.
- Arendt, H. (1963). *Eichmann in Jerusalem. A report on the banality of evil*. München: Piper.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York: McGraw-Hill.
- Brewer, M. B., & Campbell, D. T. (1976). *Ethnocentrism and intergroup attitudes: East African evidence*. New York: Halstead Press.
- Buss, A. H. (1961). *The psychology of aggression*. Hoboken, NJ: John Wiley & Sons Inc.
- Buss, D. M. (2000). *The dangerous passion*. New York: Free Press.
- Daly, M., & Wilson, M. (1988). *Homicide*. Hawthorne, NY: Aldine de Gruyter.
- Daly, M., & Wilson, M. (1996). Homicidal tendencies. *Demos*, 8, 39–45.
- Des Forges, A. (1999). *Leave none to tell the story: Genocide in Rwanda*. New York: Human Rights Watch.
- Duntley, J. D., & Buss, D. M. (2005). The plausibility of adaptations for homicide. In D.M. Buss (Eds.), *The inmate mind: Structure and contents* (pp. 291–304). New York: Oxford University Press.
- Eckart, C., Engler, H., Riether, C., Kolassa, S., Elbert, T., & Kolassa, I.-T. (2009). No PTSD-related differences in profiles of genocide survivors' diurnal cortisol. *Psychoneuroendocrinology*, 34(4), 523–531.
- Elbert, T., Rockstroh, B., Kolassa, I.-T., Schauer, M., & Neuner, F. (2006). The influence of organized violence and terror on brain and mind: A co-constructive perspective. In P. Baltes, P. Reuter-Lorenz, & F. Roesler (Eds.), *Lifespan development and the brain: The perspective of biocultural*

- co-constructivism* (pp. 326–363). Cambridge: Cambridge University Press.
- Elbert, T., Schauer, M., Schauer, E., Huschka, B., Hirsh, M., & Neuner, F. (2009). Trauma-related impairment in children. A survey in Sri Lankan provinces affected by armed conflict. *Child Abuse & Neglect, 33*, 238–246.
- Elbert, T., Weierstall, R., & Schauer, M. (2010). Fascination violence—On mind and brain of man hunters. *European Archives of Psychiatry and Clinical Neuroscience, 260*(2), 100–105.
- Feshbach, S. (1964). The function of aggression and the regulation of aggressive drive. *Psychological Review, 71*, 257–272.
- Foa, E. B. (1995). The Posttraumatic Diagnostic Scale (PDS) manual. Minneapolis, MN: National Computer Systems.
- Foa, E. B., & Tolin, D. F. (2000). Comparison of the PTSD Symptom Scale-interview version and the clinician-administered PTSD Scale. *Journal of Traumatic Stress, 13*, 181–191.
- Geen, R. G. (2001). *Human aggression* (2nd ed). London: Taylor & Francis.
- Hartup, W. W. (1974). Aggression in childhood: Developmental perspectives. *American Psychologist, 29*, 336–341.
- Hu, L., & Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives. *Structural Equation Modeling, 6*(1), 155.
- Hughes, J. F., Skaletsky, H., Pyntikova, T., Graves, T. A., Van Daleen, S. K. M., Minx, P. J., et al. (2010). Chimpanzee and human Y chromosomes are remarkably divergent in structure and gene content. *Nature, 463*, 536–539.
- Jones, D. (2008). Human behaviour: Killer instincts. *Nature, 451*, 512–515.
- Kelly, R. (2005). The evolution of lethal intergroup violence. *Proceedings of the National Academy of Sciences, 102*, 15294–15298.
- Kolassa, I.-T., & Elbert, T. (2007). Structural and functional neuroplasticity in relation to traumatic stress. *Current Directions in Psychological Science, 16*, 321–325.
- Kruger, D. J., & Nesse, R. M. (2004). Sexual selection and the male:female mortality ratio. *Evolutionary Psychology, 2*, 66–85.
- MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51*, 201–226.
- Mamdani, M. (2002). *When victims become killers*. Princeton, NJ: Princeton University Press.
- Meloy, J. R. (1988). Violent and homicidal behavior in primitive mental states. *Journal of the American Academy of Psychoanalysis, 16*, 381–394.
- Milgram, S. (1974). *Obedience to authority: An experimental view*. New York: Harper & Row.
- Nell, V. (2006). Cruelty's rewards: The gratifications of perpetrators and spectators. *Behavioral and Brain Sciences, 29*, 211–257.
- Nelson, R. J., & Trainor, B. C. (2007). Neural mechanisms of aggression. *Nature Reviews Neuroscience, 8*, 536–546.
- Neuner, F., Schauer, M., Karunakara, U., Klaschik, C., Robert, C., & Elbert, T. (2004). Psychological trauma and evidence for enhanced vulnerability for posttraumatic stress disorder through previous trauma among West Nile refugees. *BMC Psychiatry, 4*, 34.
- Paul, A. T. (2006). Fixing the impossible: guild, punishment and moral in Rwanda. *Leviathan, 34*, 30–60.
- Schaal, S., & Elbert, T. (2006). Ten years after the genocide: Trauma confrontation and posttraumatic stress in Rwandan adolescents. *Journal of Traumatic Stress, 19*, 95–105.
- Schaal, S., Elbert, T., & Neuner, F. (2009). Narrative exposure therapy versus interpersonal psychotherapy: A pilot randomized controlled trial with Rwandan genocide orphans. *Psychotherapy and Psychosomatics, 78*, 298–306.
- Schaal, S., Weierstall, R., Dusingizemungu, J.-P., & Elbert, T. (2011). *Mental health in Rwandan prisoners and in a Rwandan community sample*, submitted.
- Schauer, M., Neuner, F., Karunakara, U., Klaschik, C., Robert, C., & Elbert, T. (2003). PTSD and the “building block” effect of psychological trauma among West Nile Africans. *ESTSS (European Society for Traumatic Stress Studies) Bulletin, 10*, 5–6.
- Scheper-Hughes, N. (2003). A genealogy of genocide. *Modern Psychoanalysis, 28*, 167–197.
- Serin, R. (1991). Psychopathy and violence in criminals. *Journal of Interpersonal Violence, 6*, 423–431.
- Shackelford, T. K. (2005). An evolutionary psychological perspective on cultures of honor. *Evolutionary Psychology, 3*, 381–391.
- Staub, E. (2001). Genocide and mass killing: Their roots and prevention. In D. J. Christie, R. V. Wagner, & D. A. Winter (Eds.), *Peace, conflict, and violence: Peace psychology for the 21st century* (pp. 76–86). Englewood Cliffs, NJ: Prentice-Hall.
- Staub, E. (2006). Reconciliation after genocide, mass killing, or intractable conflict: Understanding the roots of violence, psychological recovery, and steps toward a general theory. *Political Psychology, 24*(6), 867–894.
- Steel, Z., Silove, D., Phan, T., & Bauman, A. (2002). Long-term effect of psychological trauma on the mental health of Vietnamese refugees resettled in Australia: A population-based study. *Lancet, 360*, 1056–1062.
- Vitiello, B., & Stoff, D. M. (1997). Subtypes of aggression and their relevance to child psychiatry. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*, 307–315.
- Weekes-Shackelford, V. A., Shackelford, T. K., & Buss, D. M. (2003). Murder in a lover's triangle. In M. D. Smith, & P. Blackman (Eds.), *New directions in homicide research* (pp. 219–231). Washington, DC: Federal Bureau of Investigation.
- Weierstall, R., & Elbert, T. (2011). The Appetitive Aggression Scale—development of an instrument for the assessment of human's attraction to violence. *European Journal of Psychotraumatology 2011, 2*: 8430 - doi:10.3402/ejpt.v2i0.8430
- Williamson, S., Hare, R. D., & Wong, S. (1987). Violence: Criminal psychopaths and their victims. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 19*, 454–462.
- Wood, W., & Eagly, A. H. (2002). A cross-cultural analysis of the behavior of women and men: Implications for the origins of sex differences. *Psychological Bulletin, 128*, 699–727.

---

**\*Roland Weierstall**

Department of Psychology  
 University of Konstanz  
 Konstanz  
 Baden-Wuerttemberg, Germany  
 Tel: +(49) 7531 88 4065  
 Email: roland.weierstall@uni-konstanz.de