

The Appetitive Aggression Scale—development of an instrument for the assessment of human's attraction to violence

Roland Weierstall* and Thomas Elbert

Department of Psychology, University of Konstanz, Konstanz, Germany

Background: Several instruments, notably Buss and Perry's Aggression Questionnaire, have been developed for the assessment of aggressive behavior. However, in these instruments, the focus has been on reactive rather than instrumental forms of aggression, even though men in particular may find aggressive behavior attractive. A questionnaire or structured interview for the systematic assessment of the attraction to violence is not yet available.

Objective: We, therefore, developed a freely available short form for the assessment of a person's attraction to violent and planned forms of aggression based on reports of former combatants on the attraction to violence and the characteristics of instrumental aggression described in the literature.

Method: The Appetitive Aggression Scale (AAS) was administered to nine samples drawn from different populations, with a total of 1,632 former combatants and participants from war-affected regions (1,193 male and 439 female respondents).

Results: From the initial set of 31 items, a selection of 15 items was extracted to improve the scale's psychometric properties and assess the construct of appetitive aggression validly with respect to content. Cronbach's Alpha coefficient of 0.85 was appropriate. All items loaded significantly on a single factor accounting for 32% of the total variance. Further analysis revealed that the scale measures a specific construct that can be distinguished from other concepts of human aggression.

Conclusions: With the AAS, we present an easily administrable tool for the assessment of the attraction to violence.

Keywords: *aggression; assessment; cruelty; questionnaire*

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

Received: 2 August 2011; Revised: 16 October 2011; Accepted: 28 October 2011; Published: 25 November 2011

Research on human aggression has roots in both psychology and biology (Archer, 1988). Subtyping patterns of aggressive behavior has evolved mainly from research in animals (Fontaine, 2007; Vitiello & Stoff, 1997). However, humans and some primates may display forms of aggression that are qualitatively different from behavior displayed by other animals (Elbert, Weierstall & Schauer, 2010). Appetitive aggression is viewed as the perpetration of violence and/or the infliction of harm to a victim for the purpose of experiencing violence-related enjoyment. One facet of such aggression is found only in humans and the Hominini species and is exemplified by the exposure to violence cues when the

victim struggles. However, this specific form of aggression has not been studied systematically yet.

Currently, there is no universal and generally accepted definition of aggression (Gabriel, Greve & Killias, 2006). Two broad categories of aggression are commonly defined as the instrumental (proactive/appetitive/predatory/goal directed) and the reactive (hostile/affective/defensive/retaliatory) dichotomy (Anderson & Bushman, 2002; Fontaine, 2007; McElliskem & Joseph, 2004). Even if psychological and physiological findings suggest a critical difference between these two, the question remains whether such a distinction should be categorical or dimensional (Bushman & Anderson, 2001). For example,

human aggressive behavior can be located on a continuum ranging from instrumentally used behavior in expectation of preferred rewards (Anderson & Bushman, 2002; Berkowitz, 1993) to reactive behavior in response to a certain threat and in defense of oneself, property, or other people (Anderson & Carnagey, 2004; Huesmann, 1998a). This dichotomy has proven to be useful in guiding psychological research and has served to develop prevention and treatment programs for abnormal aggressiveness (Vitiello & Stoff, 1997).

The most widely used instrument for the assessment of aggressive behavior is the Aggression Questionnaire by Buss and Perry (1992). This self-rating 29-item instrument was derived from the Hostility inventory, developed by Buss and Durkee (1957), and contains four scales including physical aggression, verbal aggression, anger, and hostility. Answers for each item are assessed on a 4-point Likert scale. The Aggression Questionnaire has been used in a variety of studies and has shown good psychometric properties (Collani & Werner, 2005; García-Leon et al., 2002; Harris, 1997). A questionnaire that also takes the instrumentally reactive dichotomy into account is the Reactive-Proactive Questionnaire, developed by Raine and colleagues (Raine et al., 2006). It has been designed to provide a brief but reliable and valid measure for the use in civil child and adolescent samples. It contains 13 items of each scale, and its construct validity has been demonstrated by a confirmatory factor analysis. However, there are no instruments that are able to account for the more extreme forms of aggression and violence in conflict and war.

Postconflict and war-affected regions as well as collective violence worldwide are characterized by escalating violence (e.g., Buvinic & Morrison, 2000; Mattaini, 2003). In line with a cycle of violence, early childhood abuse and a cruel environment facilitate the development of cruel behavior (Curtis, 1963; Elbert, Rockstroh, Kolassa, Schauer & Neuner, 2006). In addition to the specific initiating conditions that lead to an outbreak of mass violence in terrorism, gang warfare, war, and genocide, inconceivable cruelty and inhuman punitive methods shape the perpetrators' behavior throughout cultures and regions. The origins of this desire for aggression, characterized by a fascination with, and sometimes even an enjoyment of, cruelty lie in the development of hunting behavior. Human hunting behavior has evolved as a profitable strategy, and perpetrating violence against the own species has brought manifold evolutionary advantages especially for males (for further information see Jones, 2008). The legacy of the development of hunting behavior is proposed to be an appetitive reward-driven mechanism that responds to hunting-related cues such as blood and cries of the prey animal. This in turn has become adapted, through exposure to cruelty-related cues, to the suffering of human victims

(for further information see Berkowitz, 1993; Elbert et al., 2010; Miczek, Mirsky, Carey, DeBold & Raine, 1994; Nell, 2006). Even though this phenomenon has been widely described for forms collective violence, no empirical data on its structure, function, phenomenology, and neurobiological mechanisms have thus far been undertaken. A first step toward quantifying this phenomenon is in the construction of a scale for the assessment of appetitive aggressive behavior based on theoretical considerations. It was validated for different samples, principally former combatants in postconflict regions.

Here, we describe the generation of items assessed in the scale and provide information about its psychometric properties. Furthermore, we report the results of a first set of studies where the Appetitive Aggression Scale (AAS) was administered to show relations and correlations with other dimensions. The initial test length of the scale was 31 items. After considering psychometric aspects as well as content and administration time, we reduced test length to 15 items for the final version. The theoretical background of the item generation and the selection criteria are described in the methods section. The results section, then, focuses on the 15-item version.

Methods

Participants

The data were obtained in a sample of 1,632 former combatants and participants in war-affected regions (1,193 male and 439 female participants). The age range was 13–95 years ($M = 35$, $SD = 17$). It was administered within other studies of our research group to ensure a heterogeneous sample and improve external validity. A detailed list on all participants as well as references for further details of the investigations is presented in Table 1. Participants were either recruited with the permission of local authorities (e.g., Rwanda and Columbia), with the support of the non-governmental organization Vivo (www.vivo.org; e.g., Ugandan child soldiers) or were recruited in their communities (e.g., World War II veterans). All of them participated voluntarily and gave written informed consent. Ethical review boards approved all studies.

Assessment of the participant's exposure to violent acts

The assessment begins with a list of 15 items to assess the number of different violent acts committed by the respondent. We refer to this checklist as *aggressive events* (Appendix A). This list contained several acts of cruelty ranging from physical assault to rape or killings, based on the victim's reports about atrocities happening in crises regions, which we obtained in previous studies. This list was introduced to get an overview of the respondent's engagement in violence as a reference for the interviewer

Table 1. Composition of the sample ($N = 1,632$)

Sample	Sample size	Males: females	Age ($M \pm SD$)	Related publications
Former Ugandan child soldiers (abducted and non-abducted) 2009	83	83:0	21.4 \pm 2.5	Weierstall et al. (2011d)
Former Congolese combatants 2009	57	53:4	21.5 \pm 8.1	Weierstall et al. (2011a)
Ugandan children in a vulnerable learner program 2010	105	59:46	19.0 \pm 2.4	Winkler, Ruf, Ertl, et al. (2011)
Demobilized Columbian combatants 2010	251	213:38	30.8 \pm 7.9	Bueno et al. unpublished data
Male German WW II veterans and female war survivors 2010	74	54:20	86.8 \pm 2.9	Weierstall et al. (2011b)
Rwandan genocide perpetrators 2009	289	212:77	47.9 \pm 11.2	Weierstall et al. (2011c)
Rwandan genocide survivors 2009	93	77:16	47.9 \pm 9.8	Schaal et al. (2011)
Internally displaced people (Uganda) 2010/2011	463	225:238	32.2 \pm 11.3	Kolassa et al. unpublished data
Former Congolese combatants 2011	216	216:0	24.1 \pm 7.1	Hecker et al. (2011)

during the administration of the items, and it is, therefore, an essential part of the questionnaire. It also gave the interviewees a chance to recall the cruel acts that they committed before moving on to the questionnaire. We distinguish between those acts there were *self-committed* and those that were *witnessed*.

Initial generation of items

We initially created a set of 31 items that were administered to all participants. Seven items were based on the dichotomy of human aggression proposed by Vitiello and Stoff (1997). They describe instrumental aggression to be covert, proactive, offensive, predatory, controlled, with the main affective components being a feeling of self-confidence, with a positive anticipated outcome, and a low arousal level. As we expected appetitive violence to be reward driven, we created six items based on the International Classification of Diseases (ICD) 10 (WHO, Version 2007) definition of mental disorders due to psychoactive drug use, that is, psychological desire for consummation, difficulties in controlling the use, persisting use despite harmful consequences, increase in the dosage, physical craving, and a higher priority of the drug compared to other activities. Four items were generated according to the concept of reactive aggression to assess if those who experienced aggression to be appetitive also used situations of provocation to display cruel behavior. The remaining items were based on the desire to behave cruelly as reported by former combatants whom our group interviewed in former crisis regions.

We generated a question about the perception of aggression for every item in line with the theoretical assumptions. Participants had to rate the questions on a 5-point Likert scale ranging from 0 (disagree with the given question) to 4 (agree with the given question). We introduced the items with the following information:

The following questions relate to the experience of committing violence. The questions are based upon the experiences and feelings of other people who have been

involved in violent actions. We want to know if these experiences apply to you or not. Please tell me if these experiences apply to you or not. Remember that there is no right or wrong answer—just tell me what you personally think. Please answer honestly. Do not spend too much time thinking over the questions—just give your first response.

Item selection

The major goal was to design a relatively brief instrument that can be used for valid assessment of individual attraction to and desire for committing violent acts. We reduced test length for the final scale to make it easier to administer while simultaneously preserving the psychometric properties. As there are no empirical data on appetitive aggression so far, we selected those items for the final scale after completing all interviews that (1) met the construct of appetitive aggression best with respect to content as well as (2) achieved maximum reliability estimated by Cronbach's Alpha and lead to a single factor structure.

Administration

The data were collected by means of a structured interview to achieve a valid assessment of the participant's responses. Interviewers were experienced in clinical psychological assessment and diagnosis and were, as well as, being specifically trained in concepts of human aggression prior to the administration of the scale. Each item was probed before the response was rated. As the scale was administered in several different languages (German, Spanish, Kinyarwanda, Luganda, and Kikongo), we used translations from English to the local languages and back translation to the initial English version by local psychologists after training in the concepts of aggression. These were then discussed with experts from Konstanz to guarantee a valid assessment of the participant's responses.

Item formulations

For each item, the final formulations were discussed with the experts who had administered the scale in the abovementioned countries after the data collection was completed. The major goal was to provide formulations that can be translated into different languages without losing the central meaning. Furthermore, these should be easily accessible to a broad variety of participants irrespective of their educational and cultural background.

Data analysis

The data were processed using SPSS 19, applying a cutoff level for significance of $p < 0.05$. Effect sizes were calculated using G*Power 3.1 (Faul, Erdfelder, Lang & Buchner, 2007).

Results

Process of item selection

The four items dealing with reactive aggression were excluded from the initial analysis. The 27-item version of the Appetitive Aggression Scale showed a satisfactorily high homogeneity with a Cronbach's Alpha of 0.86. We calculated a principal axis factoring analysis (PFA) to investigate the underlying factor structure of all items. Twenty six out of 27 items had statistically significant factor loadings on the first factor accounting for 25% of the variance and were included in the set from which the final items were selected. Scree Plot revealed that a single factor structure could be assumed. Therefore, there was no subset of items that must have been considered in the process of item selection. The first items were excluded based on ambivalence in content. For example, even if participants reported a need for the exposure to cruelty as well as bodily experiences related to addiction, a clear distinction between psychological and physiological craving could not be drawn. As such, only the item that focused on a need to fight was kept in the final dataset, as all experts rated the given responses to that item as being more accessible. For every step of exclusion, we calculated the psychometric properties of the scale, where one item was deleted with respect to reliability (Cronbach's Alpha) and validity (PFA). We included 15 items in the final scale. Cronbach's Alpha remained still satisfactorily high (see Nunnally, 1978) with a coefficient of 0.85. We found a single factor structure in a PFA with the first factor accounting for 33% of the variance. All items had statistically significant factor loadings. Table 2 gives an overview of all the 15 items included in the final set as well as their difficulties and corrected item-total correlations.

Appetitive versus reactive aggression

To further distinguish between the two concepts of appetitive and reactive aggression, we calculated a principal factor analysis with the 15 items of the final

scale and the 4 items dealing with reactive aggression ("When I am harassed, I may strike back instantly," "When I am threatened I will defend myself and will not avoid a fight," "When I have to defend myself or others, I may be a serious fighter," "When someone makes me seriously angry, I may hit back on the spot.") in one analysis. Cronbach's Alpha coefficient for the reactive aggression subscale was 0.75 with corrected item total correlation ranging from 0.44 to 0.64. A two-factor solution revealed that all items, even the reactive aggression items, had statistically significant factor loadings onto the first factor that explained 30% of the variance. However, as can be seen in Table 2, the four reactive aggression items formed a separate dimension, loading onto the second factor that explained 10% of the common variance, whereas some of the appetitive aggression had highly negative factor loadings on the second factor. Thus, participants who scored high on the AAS also reported that they behave more aggressively in situations where they are threatened or provoked. Besides this tendency to act out a desire to behave aggressively, reactive aggression is a discrete dimension where high scoring can also be observed in those participants who do not score high on the AAS. This result is in line with the theoretical assumption of a distinction between the two concepts of appetitive and reactive aggression.

Group differences in appetitive aggression

Figure 1 gives an overview of the mean appetitive aggression scores between the different groups in our sample. We observed a main effect for the factor "group" ($F(8,1621) = 52.42$, $p < 0.001$, $\eta_p^2 = 0.21$). LSD tests for multiple group comparisons revealed statistically significant group differences between all groups, except for the three groups of former Columbian combatants, Rwandan genocide perpetrators and former Ugandan child soldiers that showed similar appetitive aggression scores, as well as, for the two Congolese samples. The group differences are in line with the degree of cruelty described in the literature between the different samples, that is, we observed the highest appetitive aggression scores in the samples from Congo. In comparison, there were lower scores in the samples in which there was a mixture of former combatants who voluntarily participated in the atrocities and those who were forced to participate. Finally, the lowest scores were in the sample of Ugandan children that corresponds to the comparably lower levels of cruelty described by this sample. However, even if there were no statistically significant differences in the AAS sum scores between the three samples from Uganda, Rwanda, and Columbia, they differed in the number of different self-committed violent acts that were determined by the aggressive events ($F(2,601) = 166.32$, $p < 0.001$, $\eta_p^2 = 0.36$).

Table 2. Item difficulties for the final 15-item appetitive aggression scale and factor loadings in a one factor solution as well as in a two factor solution when the four items of reactive aggression are included

Item	$M \pm SD$	One-factor solution		Two-factor solution	
		r	1 st factor	1 st factor	2 nd factor
1. Do you like to listen to other people telling you stories of how they killed others?	0.78 ± 1.36	0.42	0.49	0.50	0.06
2. Does the challenge of defeating a strong opponent make the fight more pleasurable for you in comparison to the defeat of a weak opponent?	0.82 ± 1.34	0.54	0.64	0.62	-0.23
3. Is it exciting for you if you make an opponent really suffer?	0.65 ± 1.24	0.54	0.64	0.59	-0.40
4. Do you feel powerful when you go to a fight?	1.46 ± 1.64	0.49	0.58	0.61	0.19
5. Is it fun to prepare yourself for fighting?	0.85 ± 1.37	0.52	0.61	0.59	-0.08
6. During fighting does the desire to hunt or kill take control of you?	0.94 ± 1.50	0.46	0.55	0.54	-0.02
7. Do you enjoy inciting your fellows to fight?	0.67 ± 1.29	0.52	0.62	0.61	-0.08
8. Is defeating the opponent more fun for you, when you see them bleed?	1.40 ± 1.61	0.36	0.44	0.40	-0.30
9. Once fighting has started, do you get carried away by the violence?	1.42 ± 1.59	0.48	0.57	0.57	-0.12
10. Did you harm others, just because you wanted to, without having a reason / order?	0.54 ± 1.14	0.55	0.65	0.61	-0.29
11. Once you got used to being cruel, did you want to be crueller and crueller?	1.17 ± 1.44	0.42	0.49	0.47	-0.12
12. Do you know what it is like to feel the hunger/thirst to fight?	1.48 ± 1.59	0.44	0.52	0.53	0.11
13. Is fighting the only thing you want to do in life?	0.98 ± 1.35	0.45	0.54	0.59	-0.29
14. Can attacking humans be sexually arousing for you?	0.38 ± 0.90	0.44	0.53	0.48	-0.39
15. When you fight, do you stop caring about whether you could be killed?	0.81 ± 1.34	0.56	0.65	0.65	0.02
Reactive 1: Do you hit back on the spot when someone makes you seriously angry?				0.50	0.58
Reactive 2: Do you attack others when you are threatened?				0.56	0.33
Reactive 3: Do you strike back instantly when you are harassed?				0.52	0.62
Reactive 4: If you have to defend yourself or others, can you be a serious fighter?				0.45	0.51

Note: r represents the corrected item-total correlations.

Aggressive behavior and appetitive aggression

Following the assumption of a cycle of violence, one would expect that those participants who committed more violent acts would also show higher appetitive aggression scores. We focused on the relation between the number of aggressive events and the appetitive aggression score in the three groups of former Columbian combatants, Rwandan genocide perpetrators, and former Ugandan child soldiers. The purpose of this was to explore whether the relation between the aggressive behavior and the appetitive aggression is comparable. We also tested this on German World War II Veterans as a sample with comparatively low AAS scores. Pearson correlation coefficients between the numbers of different aggressive events

and the AAS scores ranged between 0.24 and 0.67 with $p < 0.001$ for all four groups. We regressed the AAS score on the number of aggressive events in a linear regression analysis with Rwandan genocide perpetrators as the reference sample and three dummy variables for the three other samples. Moreover, to detect differences in the slopes of the regression lines, the three interaction terms between the group dummy variables and the aggressive events were added to the model. The proposed model had a significant impact on the variance in the data ($F(7,669) = 24.65, p < 0.001$). The regression weights and p -values are displayed in Table 3.

As indicated by the regression weights, all three groups showed different slopes in the regression lines compared

Table 3. Results of Regression Analyses predicting appetitive aggression scale sum score from the number of aggressive acts ($N = 83$)

	Appetitive aggression scale sum score	
	β	p
Number of aggressive acts (Rwandan genocide perpetrators)	0.32	<0.001
Dummy 1: former Ugandan child soldiers	-0.22	<0.001
Dummy 2: demobilized Columbian combatants	0.04	0.440
Dummy 3: male German WW II veterans and female war survivors	-0.19	<0.001
Dummy 1 \times number of aggressive acts	0.21	0.015
Dummy 2 \times number of aggressive acts	0.14	0.001
Dummy 3 \times number of aggressive acts	-0.14	0.040

Note: Uncorrected standardized regression coefficients are displayed.

to the Rwandan genocide perpetrators, while two groups also showed a significant offset in the intercept (Fig. 2).

Thus, we find relation between the AAS scores and the self-committed violence in all samples. One might

claim that samples with different backgrounds are not comparable.

Response bias through social desirability

There are a number of scales for the assessment of social desirability available (Paulhus, 1984), like the 15-item **Minnesota Multiphasic Personality Inventory Lie scale** (Mehl & Hathaway, 1946) or the 39-item Social Desirability scale (Edwards, 1957). Lie items have proven to be useful for the valid assessment of a respondent’s tendency to answer in a socially desirable way. To gain an insight into whether social desirability is a limiting factor for the assessment of appetitive aggression, we introduced three lie items in the sample of former Ugandan child soldiers that were equally scaled like the appetitive aggression items. The lie items were constructed following the advices of local clinical psychologists to address examples that apply for the adolescents (“I have at least once in my life lied to my mother,” “When I see a gun, I would look at it,” “I have at least once in my life hit somebody.”). There was no statistically significant relationship between the AAS sum score and the lie sum score ($r = 0.15$, n.s., $N = 83$).

Relation to the Aggression Questionnaire

As one would expect from the principal factor analysis, those participants who reported an attraction to aggression also scored higher on items of reactive aggression,

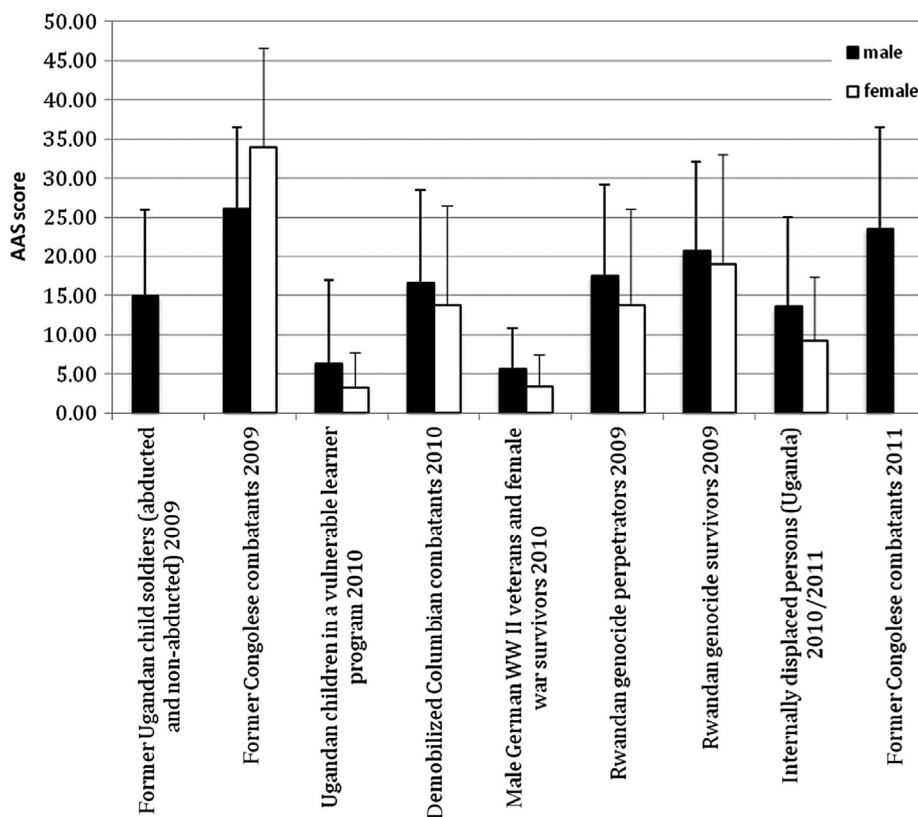


Fig. 1. Appetitive Aggression Scale sum scores by groups ($M \pm SD$).

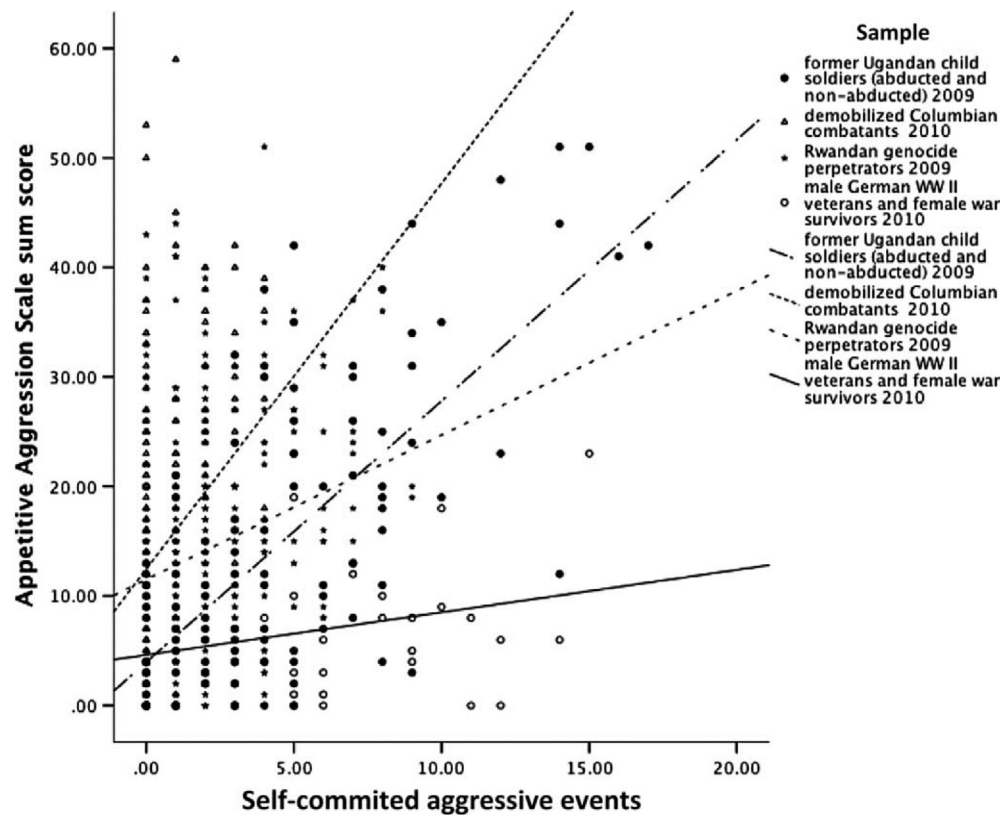


Fig. 2. Regression lines for the regression of appetitive aggression sum scores on the number of self-committed aggressive events, divided by four samples of former combatants.

leading us to hypothesize that there would be a positive relationship between the AAS and other measures of aggression. As a first step toward the evaluation of convergent and divergent validity, we also assessed the Aggression Questionnaire in the sample of former Ugandan child soldiers. We found statistically significant Pearson correlation coefficients between the AAS score and the Aggression Questionnaire score ($r_p=0.56$, $p < 0.001$) as well as its subscales on physical aggression ($r_p=0.52$, $p < 0.001$), verbal aggression ($r_p=0.39$, $p < 0.001$), hostility ($r_p=0.39$, $p < 0.001$) and anger ($r_p=0.41$, $p < 0.001$). Thus, it can be assumed that the newly developed scale measures a construct in the field of aggression.

Appetitive aggression and its relation to traumatization in perpetrators

During the first studies in which the AASs were applied, we investigated the relationship between a perpetrator's propensity toward violence and his or her risk for the development of posttraumatic stress disorder (PTSD) symptoms. We hypothesized that there must be a protective mechanism that prevents the perpetrator from becoming traumatized by his or her own atrocities. This research question was investigated in the samples of Rwandan genocide perpetrators, former Ugandan child

soldiers, and World War II veterans, and we found a lower risk for the development of PTSD symptoms in those who reported aggression to be more appetitive (Weierstall, Huth, Knecht, Nandi & Elbert, 2011a; Weierstall, Schaal, Schalinski, Dusingizemungu & Elbert, 2011c; Weierstall, Schalinski, Crombach, Hecker & Elbert, 2011d). PTSD has been assessed in all samples using the PSS-I (Foa & Tolin, 2000). The assessment of PTSD symptoms according to DSM-IV has proven cross-cultural validity (Ertl, Pfeiffer, Saile, Schauer, Elbert & Neuner, 2010). In the sample of former Ugandan child soldiers, where we had also administered the Aggression Questionnaire, we could not replicate the regression model when it was recalculated with the Aggression Questionnaire. Consequently, these results have proven on the one hand that the newly developed scale is suitable for exploring further research questions on appetitive aggression. On the other hand, the AAS measures a unique construct even if it is variably correlated with the Aggression Questionnaire.

Discussion

The aim was to develop a tool that is useful for the assessment of a person's propensity toward violence. Even if it was a human tendency to show an evolutionarily favored cruel behavior (Jones, 2008; Nell, 2006), this

facet of human aggression has not been studied systematically yet. Therefore, we created an instrument assessing appetitive aggression, that is, violence-related reward. The structured interview that may also be applied as questionnaire, initially consisted of 31 items. For the final set of items, we made a selection of 15 items that fitted the construct of appetitive aggression best with respect to content and lead to satisfying psychometric properties. Besides the high reliability estimated by Cronbach's Alpha and the single factor structure that supports the factorial validity of the instrument, we obtained results that appetitive aggression is distinct from reactive aggression, which supports the dichotomy of these two subtypes (Anderson & Bushman, 2002, Fontaine, 2007). Moreover, the results showed that there is a link between the attraction to violence and the acting out of aggressive behavior, indicated by the linear relationship between the number of different self-committed aggressive events and the score for appetitive aggression determined by the AAS. This result is stable, even though we found some differences in the intercepts and slopes of the regression lines between different groups. This may be explained by differences in the respective war scenarios, or by currently unknown factors that facilitate or attenuate the cycle of violence. However, the hypothesized relationship aligns with a cycle of violence and is a robust phenomenon, even if other factors that mediate this relationship come into play and account for the individual group differences. Similarly, further research is needed to show how the expression of a human tendency toward cruelty is mediated by the specific socioeconomic context (Bond, 2007; Geen, 1998). Furthermore, we obtained statistically significant correlations between the AAS score and the four dimensions of aggression measured with the Aggression Questionnaire. This result supports that appetitive aggression is related to other concepts in the field of aggression. However, only the AAS scores demonstrated the assumption that an attraction to violence prevents the perpetrator from becoming traumatized by his own atrocities. Therefore, the results obtained in our recent studies are essential to study the roots of traumatization in perpetrators of violence. Moreover, they raise new research questions about which mechanisms underlie the processing of violence cues and potentially traumatizing events. Taken together, these promising results for the newly developed scale provide sufficient evidence to administer the scale in future studies as a measure for appetitive aggression.

Despite the satisfying psychometric properties of the AAS, there are still important questions that need to be addressed in future research. How does a cycle of violence evolve? Hostility, dehumanization, and conflicts on resources have marked the beginning of escalating violence in most conflict regions. However, the threshold when aggression becomes self-rewarding has not been

researched. Moreover, as the instrumental use of aggression has mostly been linked to dominance (Kemper, 1990; Mazur & Booth, 1998) or dissocial behavior (Booth, Granger, Mazur & Kivlighan, 2006), the link to related concepts needs further observation. Research has assumed that the purposeful hunting of humans was an activity carried out only by "psychopaths" (Meloy, 1988; Serin, 1991; Williamson, Hare & Wong, 1987). However, the extent of appetitive aggression in our male samples contradicts such an exclusive assumption. It is necessary to disentangle psychopathology in general and psychopathy in particular from appetitive aggression. Moreover, the lack of emotional arousal that has also been described by Vitiello and Stoff (1997) as a characteristic of instrumental aggression does not hold for the appetitive perception described by the perpetrators in our samples. They reported being carried away by the violence rather than being controlled and calm while committing crimes. Future research has to address the relationship between emotional arousal and emotional valence in appetitive aggression according to the biphasic theory of emotions (Lang, 1985, 2000) to specify how an appetitive perception of violence cues motivates future violent behavior. Even if appetitive aggression is a common phenomenon among male perpetrators, there is no adequate therapeutic intervention available that would be essential for the reintegration of former combatants into society. Moreover, even if we did not find a significant relation between the scorings on the three lie items and the AAS score in the Ugandan child soldiers sample as well as we obtained robust effects across groups for the relation to trauma and the number of self-committed violent acts, the influence of social desirability needs further elaboration with more sensitive instruments. Other important questions concern the roles of sex and gender. It seems that women are much less drawn to appetitive aggression and may become offenders only when mentally ill, raised under very poor conditions (Rossegger et al., 2009).

Limitations derive from the sample composition. All participants were either former combatants or had been exposed to severe forms of organized violence. The newly developed scale is suitable for the assessment of appetitive aggression in former combatants and thus would have to be adapted for populations not exposed to violent acts, even if the underlying human attraction to cruelty can be considered as a common phenomenon that may not be acted out when living under peaceful conditions (Elbert et al., 2010; Nell, 2006).

Conclusion

We have developed a tool for the assessment of appetitive aggression. The appetitive aggression scale (including the aggressive event list and a manual) is freely available on request by the authors. It aims to further guide the research on aggressive behavior including cruelty.

A modified version of the scale for the administration in non-war-affected samples is currently being tested.

Conflict of interest and funding

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

Acknowledgements

The support from all principal investigators who integrated the scale into their projects as well as the following researchers whose contribution to the present development is gratefully acknowledged. We thank Claudia Bueno, Anselm Crombach, Roos Haer, Tobias Hecker, Katharin Hermenau, Iris Kolassa, Anna Maedl, Martina Ruf, Susanne Schaal, Inga Schalinski, Maggie Schauer, and Nina Winkler.

References

- Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 52, 27–51.
- Anderson, C. A., & Carnagey, N. L. (2004). Violent evil and the general aggression model. In A. G. Miller (Ed.), *The social psychology of good and evil* (pp. 168–192). New York: Guilford Publications.
- Archer, J. (1988). *The behavioural biology of aggression*. Cambridge: Cambridge University Press.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences and control*. New York: McGraw-Hill, Inc.
- Bond, M. H. (2007). Culture and collective violence: How good people, usually men, do bad things. In B. Drošdek, & J. P. Wilson (Eds.), *Voices of trauma. treating survivors across cultures* (pp. 27–58). New York: Springer.
- Booth, A., Granger, D. A., Mazur, A., & Kivlighan, K. T. (2006). Testosterone and social behavior. *Social Forces*, 85(1), 167–191.
- Bushman, B. J., & Anderson, C. A. (2001). Is it time to pull the plug on the hostile versus instrumental aggression dichotomy? *Psychological Review*, 108(1), 273–279.
- Buss, A. H., & Durkee, A. (1957). An inventory for assessing different kinds of hostility. *Journal of Consulting Psychology*, 21, 343–349.
- Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, 63(3), 452–459.
- Buvinic, M., & Morrison, A. R. (2000). Living in a more violent world. *Foreign Policy*, 118, 58–72.
- Collani, G., & Werner, R. (2005). Self-related and motivational constructs as determinants of aggression. An analysis and validation of a German version of the Buss-Perry Aggression Questionnaire. *Personality and Individual Differences*, 38, 1631–1643.
- Crombach, A., Weierstall, R., Hecker, T., Schalinski, I., & Elbert, T. (2011). Social status and the desire to resort to violence—A study on former child soldiers of Uganda, submitted.
- Curtis, G. C. (1963). Violence breeds violence—Perhaps? *Am J Psychiatry*, 120, 386–387.
- Edwards, A. L. (1957). *The social desirability variable in personality assessment and research*. New York: Dryden Press.
- 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. Rösler (Eds.), *Lifespan development and the brain: The perspective of biocultural co-constructivism* (pp. 326–349). New York: Cambridge University Press.
- 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.
- Ertl, V., Pfeiffer, A., Saile, R., Schauer, E., Elbert, T., & Neuner, F. (2010). Validation of a mental health assessment in an African conflict population. *Psychology Assessment*, 22(2), 318–324.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis for the social, behavioral, and biomedical sciences. *Behaviour of Research Methods*, 39, 175–191.
- 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.
- Fontaine, R. G. (2007). Disentangling the psychology and law of instrumental and reactive subtypes of aggression. *Psychology, Public Policy, and Law*, 13(2), 143–165.
- Gabriel, U., Greve, W., & Killias, M. (2006). Perspectives on Aggression—Trends and Agendas für psychological research. *Swiss Journal of Psychology*, 65(2), 77–79.
- García-Leon, A., Reyes, G. A., Vila, J., Pérez, N., Robles, H., & Ramos, N. N. (2002). The Aggression Questionnaire: A validation study in student samples. *The Spanish Journal of Psychology*, 5(1), 45–53.
- Geen, R. G. (1998). Processes and personal variables in affective aggression. In R. G. Geen, & E. Donnerstein (Eds.), *Human aggression* (pp. 1–21). San Diego: Academic Press.
- Hecker, T., Hermenau, K., Maedl, A., Elbert, T., & Schauer, M. (2011). Fascination of Violence in former Combatants - derived from the ongoing Conflict in DR Congo. *International Journal of Law and Psychiatry*. (in press).
- Huesmann, L. R. (1998a). The role of social information processing and cognitive schema in the acquisition and maintenance of habitual behavior. In R. G. Geen, & E. Donnerstein (Eds.), *Human aggression* (pp. 73–109). San Diego: Academic Press.
- Jones, D. (2008). Human behavior: Killer instincts. *Nature*, 451, 512–515.
- Kemper, T. D. (1990). *Social structure and testosterone. Explorations of the socio-bio-social-chain*. New Brunswick: Rutgers University Press.
- Lang, P. J. (1985). The cognitive psychophysiology of emotion: Fear and anxiety. In A. Hussain Tuma, & J. Maser (Eds.), *Anxiety and the anxiety disorders* (pp. 131–170). Hillsdale, NJ: Erlbaum.
- Lang, P. J. (2000). Emotion and motivation: Attention, perception, and action. *Journal of Sport and Exercise Psychology*, 22, S122–S140.
- Mattaini, M. A. (2003). Understanding and reducing collective violence. *Behavior and social issues*, 12, 90–108.
- Mazur, A., & Booth, A. (1998). Testosterone and dominance in men. *Brain and Behavioral Sciences*, 21, 353–397.
- McElliskem, J. E. (2004). Affective and predatory violence: A bimodal classification system of human aggression and violence. *Aggression & Violent Behavior*, 10, 1–30.
- Mehl, P. E., & Hathaway, S. R. (1946). The K factor as a suppressor variable in the Minnesota multiphasic personality inventory. *Journal of Applied Psychology*, 30, 525–564.
- Meloy, J. R. (1988). Violent and homicidal behavior in primitive mental states. *Journal of the American Academy of Psychoanalysis*, 16, 381–394.
- Miczek, K. A., Mirsky, A. F., Carey, G., DeBold, J., & Raine, A. (1994). An overview of biological influences on violent behavior. In A. J. Reiss, K. A. Miczeck, & J. A. Roth (Eds.), *Understanding and preventing violence* (Vol. 2—Biobehavioral Influences, pp. 1–20). Washington, DC: National Academy Press.
- Nell, V. (2006). Cruelty's rewards: The gratification of perpetrators and spectators. *Behavioral and Brain Sciences*, 29(3), 211–224.

- Nunnally, J. (1978). *Psychometric theory*. New York: McGraw-Hill.
- Paulhus, D. L. (1984). Two-component models of social desirability responding. *Journal of Personality and Social Psychology*, 46(3), 598–609.
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lyna, D., Reynolds, C., et al. (2006). The reactive-proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior*, 32, 159–171.
- Rossegger, A., Weltli, N., Urbaniok, F., Elbert, T., Cortoni, F., & Endrass, J. (2009). Women convicted for violent offenses: Adverse childhood, limited education and poor mental health. *BMC Psychiatry*, 9, 81.
- Serin, R. (1991). Psychopathy and violence in criminals. *Journal of Interpersonal Violence*, 6, 423–431.
- Vitiello, B., & Stoff, D. M. (1997). Subtypes of aggression and their relevance to child psychiatry. *Journal of American Academic Child Adolescents Psychiatry*, 36, 307–315.
- Weierstall, R., Banholzer, L., Haer, R., & Elbert, T. (2011a). Becoming cruel – Insights from a survey with former Congolese soldiers. submitted.
- Weierstall, R., Huth, S., Knecht, J., Nandi, C., & Elbert, T. (2011b). Enjoying cruelty as a resilience factor for the long-term effects of war: Appetitive aggression and post-traumatic stress disorder in German World War II veterans. *Journal of Traumatic Stress*, submitted.
- Weierstall, R., Schaal, S., Schalinski, I., Dusingizemungu, J. P., & Elbert, T. (2011c). The thrill of being violent as an antidote to posttraumatic stress disorder in Rwandese genocide perpetrators. *European Journal of Psychotraumatology* 2011, 2: 6345 - doi:10.3402/ejpt.v2i0.6345
- Weierstall, R., Schalinski, I., Crombach, A., Hecker, T., & Elbert, T. (2011d). When combat prevents PTSD symptoms – Results from a survey with former child soldiers in Northern Uganda. *BMC Psychiatry*, submitted.
- 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.
- Winkler, N., Ruf, M., Ertl, V., Pfeiffer, A., Schalinski, I., Ovuga, E., Neuner, F. & Elbert, T. (2011). From war to classroom: mental suffering in former child soldiers of Uganda, submitted.

***Roland Weierstall**

Department of Psychology
University of Konstanz
DE-78476 Konstanz, Germany
Email: roland.weierstall@uni-konstanz.de

Appendix A Events Appetitive Aggression Scale

	Have you ever	Yes	Witnessed
	1 ... physically assaulted another person (e.g. beaten someone up)?		
	2 ... injured another person with a weapon (e.g. a knife)?		
	3 ... made another person scream in pain?		
	4 ... made another person bleed?		
	5 ... made another person beg for his/her life?		
	6 ... been cruel and made another person suffer from physical pain?		
	7 ... mutilated another person?		
	8 ... killed another person?		
	9 ... killed another person where you had the choice not to?		
	10 ... harmed another person who could not defend him/herself?		
	11 ... instructed others to harm another person?		
	12 ... pursued another person that you wanted to harm?		
	13 ... sexually assaulted another person?		
	14 ... talked to others about experiences with inflicting harm?		
	15 ... desecrated dead bodies?		
	16 ... defended yourself in a fight?		
	17 ... hit back when being attacked?		

Have you ever harmed someone in any other way? How?
