



The cycle of violence as a function of PTSD and appetitive aggression: A longitudinal study with Burundian soldiers

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Abstract

During deployment, soldiers face situations in which they are not only exposed to violence but also have to perpetrate it themselves. This study investigates the role of soldiers' levels of posttraumatic stress disorder (PTSD) symptoms and appetitive aggression, that is, a lust for violence, for their engaging in violence during deployment. Furthermore, factors during deployment influencing the level of PTSD symptoms and appetitive aggression after deployment were examined for a better comprehension of the maintenance of violence. Semi-structured interviews were conducted with 468 Burundian soldiers before and after a 1-year deployment to Somalia. To predict violent acts during deployment (perideployment) as well as appetitive aggression and PTSD symptom severity after deployment (postdeployment), structural equation modeling was utilized. Results showed that the number of violent acts perideployment was predicted by the level of appetitive aggression and by the severity of PTSD hyperarousal symptoms predeployment. In addition to its association with the pre-deployment level, appetitive aggression postdeployment was predicted by violent acts and trauma exposure perideployment as well as positively associated with unit support. PTSD symptom severity postdeployment was predicted by the severity of PTSD avoidance symptoms predeployment and trauma exposure perideployment, and negatively associated with unit support. This prospective study reveals the importance of appetitive aggression and PTSD hyperarousal symptoms for the engagement in violent acts during deployment, while simultaneously demonstrating how these phenomena may develop in mutually reinforcing cycles in a war setting.

KEYWORDS

aggression, deployment, PTSD, soldiers, violence

1 | INTRODUCTION

For soldiers, war frequently requires acts of aggression and violence as part of their duty. We do not know which psychological factors,

however, contribute to violent actions by soldiers and which factors contribute to the continuance of violence even after returning home.

In general, war-affected people find themselves in situations in which they are exposed to many potentially traumatic experiences. The

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greater the cumulative exposure to traumatic stressors the greater the risk for posttraumatic stress disorder (PTSD), a so-called building block of trauma that has been reported in civilians (e.g., Neuner et al., 2004; Wilker et al., 2015) as well as combatant populations (Köbach, Schaal, & Elbert, 2014; Nandi, Crombach, Bambonye, Elbert, & Weierstall, 2015). In a substantial proportion of soldiers, the exposure to combat, including threat and violence, results in chronic PTSD (e.g., Prigerson, Maciejewski, & Rosenheck, 2001; Schauer & Elbert, 2010). However, unit support and unit cohesion can buffer the risk (Brailey, Vasterling, Proctor, Constans, & Friedman, 2007; Pietrzak et al., 2010).

Several past studies in different countries and cultures could link symptoms of PTSD to violent behavior in soldiers and veterans (Kwan et al., 2016; MacManus et al., 2013; McFall, Fontana, Raskind, & Rosenheck, 1999; Stappenbeck, Hellmuth, Simpson, & Jakupcak, 2014). While most research examined PTSD as a single construct, some studies distinguished between the different symptom clusters and demonstrated evidence that the hyperarousal cluster was most strongly associated with the perpetration of violence (MacManus et al., 2013; McFall et al., 1999; Savarese, Suvak, King, & King, 2001; Taft et al., 2007). Intrusion symptom severity was not linked to violent acts, whereas contradictory findings exist for the avoidance cluster, positively linked to violent behavior in one study but negatively linked in another (McFall et al., 1999; Taft et al., 2007). Whereas the previous studies investigated violent behavior after war and deployment, research on predictors of violent acts during deployment has been lacking.

In the specific situation of soldiers, we cannot separate the contribution of violence to the development and maintenance of PTSD, that is, how much violence is driven by PTSD and conversely, how much does the violence perpetrated by soldiers contribute to PTSD symptoms. Although previous research reported associations between self-committed aggressive acts and PTSD (MacNair, 2002; Maguen et al., 2010), others could not confirm this finding (Hecker, Hermenau, Maedl, Hinkel et al., 2013; Köbach, Schaal, & Elbert, 2015). The latter studies rather suggest that self-committed violence is not inevitably processed as traumatic. In fact, a significant proportion of combatants even describe perpetrating violence as being exciting, fascinating, and appealing. Such a perception of violence may be a useful adaptation to violent contexts as it might buffer the development of PTSD symptoms (e.g., Hecker, Hermenau, Maedl, Schauer, & Elbert, 2013; Nandi, Crombach, Bambonye, Elbert, & Weierstall, 2016).

The term *appetitive aggression* has been introduced to describe this primarily positive and rewarding perception of violent cues (Elbert, Weierstall, & Schauer, 2010). In contrast to reactive aggression, which is a defense against threat, or instrumental aggression, which is driven by an extrinsic reward, appetitive aggression describes the intrinsic enjoyment of violence. A number of studies found appetitive aggression to be closely associated with the perpetration of violence (e.g., Crombach, Weierstall, Hecker, Schalinski, & Elbert, 2013; Hecker, Hermenau, Maedl, Elbert, & Schauer, 2012).

Elbert, Schauer, and Moran (2018) describe a “bi-cycle” of violence and postulate that violence often results from a combination of reactive and appetitive aggression. Correspondingly, a study with Burundian street children demonstrated an effect of both, appetitive aggression and reactive aggression, which was associated with PTSD, on violent acts (Crombach & Elbert, 2014). A study with Burundian soldiers could show that appetitive aggression as well as PTSD symptoms were associated with the perpetration of community violence at home after deployment (Nandi et al., 2017). However, the correlative nature of the studies was not capable of disentangling potential reciprocal relationships between the perpetration of violence and the development of appetitive aggression. It can be hypothesized that appetitive aggression fosters the exercise of violence and in turn, increased violent offending results in an increasing pleasure in harming others (Elbert et al., 2018). In combination with trauma and PTSD, this could develop into mutually reinforcing cycles of violence.

1.1 | The present study

During the Burundian civil war, which erupted in 1993 and lasted more than a decade, many Burundian soldiers survived long periods of combat and atrocities. Since the end of the civil war in 2006, thousands of these soldiers have been deployed to Somalia as part of the peacekeeping African Mission (AMISOM). The present study investigated Burundian soldiers immediately before and after a 1-year deployment in Somalia. The longitudinal design allowed us to examine the reciprocal relationships of trauma, self-committed violence, PTSD symptoms, and appetitive aggression. In a path model, we focused on violent acts during deployment, that is, in a setting where aggressive behavior is required but regimented simultaneously. Moreover, we investigated the level of PTSD symptoms and appetitive aggression after deployment to comprehend the recurrence and continuation of violence in a war setting. Based on previous research (Brailey et al., 2007; Pietrzak et al., 2010), we included *unit support* in our analyses and expected it to serve as a resilience factor preventing PTSD symptoms. Since perceived cohesion and support among comrades might encourage aggressive acts and change the perception of it (Dutton, 2007; Elizur & Yishay-Krien, 2009), unit support might also be a predictor for violent acts and appetitive aggression.

We hypothesized that (a) appetitive aggression and PTSD hyperarousal symptom severity predeployment predict violent acts perideployment; (b) the predeployment level of appetitive aggression, and violent acts perideployment predict appetitive aggression postdeployment; (c) PTSD symptom severity predeployment, and trauma exposure perideployment predict PTSD symptom severity postdeployment; (d) unit support perideployment is positively linked to violent acts perideployment and appetitive aggression postdeployment and negatively linked to PTSD symptom severity postdeployment.

2 | METHODS

2.1 | Participants

We obtained data of 488 male Burundian soldiers before their deployment to Somalia (t0; November 2012–January 2013) and data of 468 soldiers 1–3 months after their return (t1; March–July 2014). Twenty soldiers of the initial participants of t0 could not be located at t1. Specifications of the dropouts cannot be reported because it was not possible to obtain reliable information, for example, whether they were dead, injured, or deserted. Two participants were excluded from the first part of the analyses and another five participants for the second part of the analyses due to missing data in the crucial variables.

On average, the length of the deployment was 13 months; only four soldiers stayed < 9 months in Somalia. Soldiers were on average 35.0 (standard deviation [SD] = 5.0) years old at the time of deployment, and 19.6 (SD = 3.8) years old when they had joined an armed group. Eighty-four percent held the rank of a corporal or chief corporal, which constitutes an ordinary soldier in Burundi. About 5% held a higher rank. Over 54% had attended school for 6 years ($M = 6.3$, $SD = 2.3$), which is the regular time for a primary school in Burundi. Almost 90% had attended school between 4 and 8 years. Eighty percent were married.

2.2 | Procedure

The ethical committees (IRBs) of the University of Konstanz, Germany and of the University Lumière of Bujumbura, Burundi approved this study. Soldiers were randomly chosen from two battalions of the Burundian army. They were recruited via several study presentations by the researchers at the military camp. Beforehand, all soldiers were informed by their commanders about the study. Participation was voluntary and the soldiers had to sign an informed consent before the interviews. With respect to the special vulnerability of the population, anonymity and confidentiality were ensured through the electronic coding and storage of the data, which fulfilled the highest and most secure data encryption standards (Schobel, Schickler, Pryss, Maier, & Reichert, 2014).

Eight clinical psychologists and 14 advanced students of clinical psychology from the University Lumière of Bujumbura, Burundi and the University of Konstanz, Germany carried out interviews. Interviews were conducted either in Kirundi by the local interviewers or in English with the help of professional interpreters by the German psychologists. Before administration in the interview, all questionnaires had been translated from English into Kirundi, using back and forth translations. Translations were intensively discussed in a transcultural expert committee of clinical psychologists to ensure accuracy and validity. All interviewer and interpreters received extensive training in the concepts of mental disorders and aggression before the data collection and received constant supervision to ensure data quality. The interviewer training included conducting interviews together with an experienced clinical psychologist and

determining the inter-rater reliability. Interviews were conducted at military camps in the region of Bujumbura. On average, the interviews before the deployment lasted one and a half hours and interviews after the deployment two and a half hours. The soldiers received no incentive for their participation. In the case of travel costs, financial compensation was paid for reimbursement.

2.3 | Measures

All instruments were applied as semi-structured interviews.

2.3.1 | PTSD symptom severity

Symptoms of PTSD were assessed using the *PTSD Symptom Scale-Interview* (PSS-I; Foa, Riggs, Dancu, & Rothbaum, 1993). The PSS-I is a semi-structured interview, which consists of 17 items and has proven its validity in comparable East-African samples (Ertl et al., 2010). The items correspond to the 17 symptoms of PTSD according to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV; American Psychiatric Association, 2002). DSM-IV was chosen as DSM-V had not been validated at the time of the first data collection. Item scores can either be summed to a total score or to the subscores of re-experiencing (DSM-IV B-Criterion; five items), avoidance (DSM-IV C-Criterion; seven items), and hyperarousal (DSM-IV D-Criterion; five items). The assessment of symptom severity refers to the last 2 weeks and is based on a 4-point Likert scale ranging from 0 (not at all) to 3 (five or more times per week/almost always). The total score has a potential range from 0 to 51. In the present study, Cronbach's α for the scale was .87 (t0) and .88 (t1). For the prediction of *violent acts perideployment* and *PTSD symptom severity postdeployment*, we split the total sum score of *PTSD symptom severity predeployment* in three single sum scores according to the three clusters of PTSD in the DSM-IV: *intrusion symptom severity predeployment* (Cronbach's $\alpha = .84$, possible range 0–15), *avoidance symptom severity predeployment* (Cronbach's $\alpha = .71$, possible range 0–21), and *hyperarousal symptom severity predeployment* (Cronbach's $\alpha = .69$, possible range 0–15), each of them representing an independent predictor variable. We considered the diagnosis of PTSD as fulfilled if the soldiers reported a sufficient number of items for each cluster according to the DSM-IV, that is, at least one item for the intrusion cluster, at least three items for the avoidance cluster, and at least two items for the hyperarousal cluster.

2.3.2 | Appetitive aggression

Appetitive aggression was assessed using the *Appetitive Aggression Scale* (AAS; Weierstall & Elbert, 2011). The AAS consists of 15 items (e.g., "Is it exciting for you if you make an opponent really suffer?" or "Once fighting has started do you get carried away by the violence?"). Ratings are based on a 5-point Likert scale ranging from 0 ("I totally disagree")

to 4 ("I totally agree"). Items were summed, with a possible range from 0 to 60. Validation analyses revealed that the AAS measures a distinct construct of human aggression (Weierstall & Elbert, 2011). In the present study, Cronbach's α for the scale was .83 (t0) and .82 (t1).

2.3.3 | Violent acts perideployment (t1)

To measure violent acts perideployment, we assessed 17 different types of violent acts, including a variety of acts, which have been reported in different combatant populations, the world over (Weierstall & Elbert, 2011), and four items from the *Deployment Risk and Resilience Inventory-2* (DRRI-2) combat experiences scale (Vogt et al., 2013) to acknowledge the specific context in Somalia (see Supporting Information for details). Binary items were summed to a total score, with higher values indicating a higher level of exerted violence.

2.3.4 | Trauma exposure predeployment (t0)

Lifetime exposure to different types of traumatic events predeployment was assessed using a checklist of 19 events (see Supporting Information for details). The checklist was an adapted version of a checklist that has been used previously with populations affected by violent conflicts (Neuner et al., 2004), covering all events from the checklist of the Posttraumatic Stress Diagnostic Scale (Foa, Cashman, Jaycox, & Perry, 1997). Binary items were summed as a measure for trauma load, with higher values representing a higher burden.

2.3.5 | Trauma exposure perideployment (t1)

Exposure to different types of traumatic events perideployment was assessed by using a checklist of 43 events. It covered all events from the checklist predeployment. In addition, items of the DRRI-2 were included, a set of 17 individual scales that assess key deployment-related risk factors and which has demonstrated its validity in military forces (Vogt et al., 2013). We chose items of the combat experiences and postbattle experiences scale. Moreover, potentially traumatic events were added to depict the specific situation in Somalia (see Supporting Information for details). Items were coded and summed in the same manner as for t0.

2.3.6 | Unit support perideployment (t1)

Unit support perideployment was measured on the basis of five items chosen from the DRRI-2 *unit support scale* (see Supporting Information for details). Ratings were based on a 5-point Likert scale ranging from 0 ("I totally disagree") to 4 ("I totally agree") and summed, with a possible range from 0 to 20. In the present study, Cronbach's α for the scale was .78.

2.4 | Data analysis

Statistical analyses were performed using SPSS 25. To predict *violent acts perideployment* as well as *appetitive aggression* and *PTSD symptom severity postdeployment* in a longitudinal design, a bootstrapped path analysis was conducted using AMOS 25. We built the path model based on theoretical assumptions (Hu & Bentler, 1999) and excluded insignificant paths in a stepwise manner. The final model was selected according to the Akaike information criterion and parsimonious fit indices. All analyses used a two-tailed $\alpha = .05$.

3 | RESULTS

Descriptive statistics of all relevant variables are presented in Table 1.

All soldiers were exposed to at least one severe traumatic event predeployment. For instance, 93% had witnessed a killing and 47% had witnessed a massacre. Perideployment, 97% of the soldiers were exposed to at least one traumatic event such as "being attacked by an enemy" (29%), "experiencing suicide attack" (25%), or "witnessing comrade being killed" (3%). Lifetime trauma exposure predeployment was higher than trauma exposure perideployment.

On average, the rate of violent acts carried out perideployment was low. The majority of soldiers reported to not have conducted violent acts. Twenty-one percent of the soldiers ($n = 97$) reported one or more violent acts perideployment.

The average degree of PTSD symptom severity predeployment was low and only slightly increased after deployment. Before the

TABLE 1 Descriptive statistics

Variable	N	Mdn	M (SD) [range]
PTSD symptom severity predeployment	466	1	2.99 (4.59) [0–32]
Intrusion	466	0	0.88 (1.88) [0–11]
Avoidance	466	0	1.19 (1.96) [0–13]
Hyperarousal	466	0	0.93 (1.66) [0–10]
PTSD symptom severity postdeployment	461	1	3.55 (5.10) [0–41]
Appetitive aggression predeployment	466	18	19.47 (10.67) [0–46]
Appetitive aggression postdeployment	466	15	16.33 (8.78) [0–51]
Violent acts perideployment	466	0	0.45 (0.89) [0–8]
Trauma exposure predeployment	466	11	10.54 (3.23) [1–18]
Trauma exposure perideployment	466	5	5.87 (3.45) [0–22]
Unit support perideployment	466	15	15.67 (2.63) [1–20]

Abbreviations: M, mean; Mdn, median; PTSD, posttraumatic stress disorder; SD, standard deviation.

TABLE 2 Intercorrelations (Spearman's ρ) between variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. PTSD intrusion pre	-							
2. PTSD avoidance pre	.51***							
3. PTSD hyperarousal pre	.48***	.59***						
4. Appetitive aggression pre	.10*	.13**	.09					
5. Violent acts peri	.07	.07	.12**	.13**				
6. Trauma exposure peri	.04	.03	.05	.12*	.43***			
7. Unit support peri	-.01	-.07	-.08	-.01	.10*	-.04		
8. PTSD symptom severity post	.10*	.16**	.11*	.10*	.03	.10*	-.17***	
9. Appetitive aggression post	.16**	.17***	.08	.28***	.17***	.19***	.13**	.10*

Abbreviation: PTSD, posttraumatic stress disorder.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

deployment (t0), 7% of the soldiers ($n = 33$) fulfilled the criteria for a PTSD-diagnosis. After the deployment (t1), 8% ($n = 37$) fulfilled the criteria for a PTSD-diagnosis. From t0 to t1, 36% ($n = 164$) reported a decrease and 40% ($n = 183$) presented with an increased PTSD symptom severity. Intercorrelations (Spearman's ρ) between variables are presented in Table 2.

Results of the path model are displayed in Figure 1. The final model fitted the data according to the following criteria for a good-fitting model: $\chi^2(13) = 15.02$, $p = .31$, $\chi^2/df = 1.16$, goodness-of-fit index: 0.993, comparative fit index = 0.997, root-mean-square error of approximation = 0.018, 90% CI [0.000, 0.052].

The selected model revealed *appetitive aggression predeployment* and *PTSD hyperarousal symptom severity predeployment* as significant predictors for *violent acts perideployment* (5% variance explanation). No other PTSD symptom cluster showed a significant association. *Unit support perideployment* showed a tendential positive association with *violent acts perideployment*, but did not reach significance.

Appetitive aggression predeployment additionally predicted *trauma exposure perideployment*.

Appetitive aggression postdeployment was significantly predicted by *appetitive aggression predeployment*, *violent acts perideployment*, *trauma exposure perideployment*, and *unit support perideployment* (14% variance explanation).

PTSD symptom severity postdeployment was significantly predicted by *PTSD avoidance symptom severity predeployment* and *trauma exposure perideployment* as well as negatively predicted by *unit support perideployment* (10% variance explanation). No other PTSD symptom cluster showed a significant association.

4 | DISCUSSION

4.1 | Prediction of violent acts during deployment

In line with the hypotheses, both the level of appetitive aggression and the severity of PTSD hyperarousal symptoms before deployment were predictors of violent acts during deployment, whereas none of the other PTSD clusters had an additional effect. This result also corresponds to the findings of another study, in which appetitive aggression was beyond PTSD symptoms linked to community violence (Nandi et al., 2017). However, the present study was the first to find an effect of appetitive aggression on committed violence in a longitudinal design and in a setting of foreign deployment of soldiers, in which the perpetration of violence might be required to a certain degree. The differences between individual soldiers in the extent of appetitive aggression underline its impact on the probability to act out violent acts. PTSD hyperarousal and an appeal for aggression both independently contributed to the behavioral outcome.

The concept of the bi-cycle of violence describes how violence can result from a combination of proactive-appetitive and reactive-defensive mechanisms, driving two interconnected cycles of violence (Elbert et al., 2018). Appetitive aggression leads to an increased

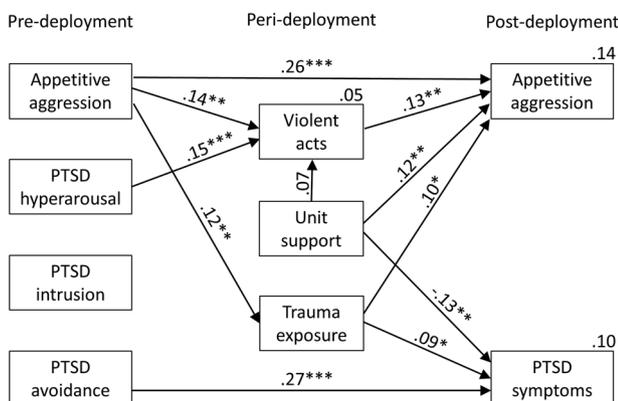


FIGURE 1 Prediction of violent acts perideployment and appetitive aggression/PTSD symptom severity postdeployment. Note: Standardized regression coefficients are displayed. PTSD, posttraumatic stress disorder. * $p < .05$, ** $p < .01$, *** $p < .001$

propensity to use violence, with repeated violent offenses in turn intensifying their positive perception. Reactive aggression represents a sort of aggression related to feeling threatened and associated with aversive emotions like anger, anxiety, or fear (Anderson & Bushman, 2002; Marsee, Weems, & Taylor, 2008). These same emotions have been linked to hyperarousal in PTSD (Elbogen et al., 2010). With cumulative exposure to traumatic experiences, PTSD symptoms will intensify. Resultant heightened levels of alertness and vigilance can lower the threshold for detecting threat (e.g., Olatunji, Armstrong, McHugo, & Zald, 2013) and therefore increase the probability of aggressive outbursts (Elbert et al., 2018).

The finding of this study that hyperarousal symptoms alone, but none of the other PTSD-clusters, preceded violent behavior corresponds to previous studies with veterans, which could also demonstrate the crucial role of hyperarousal compared with other PTSD symptoms (MacManus et al., 2013; Savarese et al., 2001; Taft et al., 2007). However, contradictory to veterans who had returned home from deployment, deployed soldiers usually face real life-danger. The borderline between real danger and perceived threat can be blurred. The typically low level of PTSD symptoms found in the present study underlines the fact that the soldiers investigated in the present study are not a clinical sample but represent a rather resilient group when compared with, for instance, Burundian demobilized combatants with the same past trauma load (Nandi et al., 2015). Hyperarousal with its excessive alertness and responsiveness to sensory cues might, therefore, also be seen as a preparedness for fight or flight, enabling a rapid response to actual threat and increasing the chances of survival in life-threatening situations.

A further explanation of the connection between appetitive aggression and violent acts during deployment could be that soldiers perceiving violence as appealing might actively seek situations where violence is likely to occur. This fact could also explain the observed association between appetitive aggression before the deployment and trauma exposure during deployment.

4.2 | Prediction of appetitive aggression and PTSD symptom severity after deployment

The path model revealed that the level of appetitive aggression immediately after the deployment was predicted by its baseline level before the deployment and—congruent with the hypothesis based on previous studies in postconflict settings (e.g., Hecker et al., 2012; Köbach et al., 2015; Nandi et al., 2015)—by perpetrated violent acts during the deployment. Trauma exposure had an additional influence on appetitive aggression. As this relationship has been demonstrated in several studies, one could presume that appetitive aggression generally increases in adverse, violent environments as an adaptive self-defense mechanism (Crombach & Elbert, 2014; Nandi et al., 2015; Weierstall & Elbert, 2011). Due to the prospective design of the study, this finding supports the assumption of a reciprocal relationship between self-committed

violence and appetitive aggression, continuously mutually reinforcing one another (Crombach et al., 2013; Elbert et al., 2018).

As expected, PTSD symptom severity after the deployment was predicted by the baseline level of PTSD symptom severity before the deployment. However only symptoms of the PTSD avoidance cluster were significantly associated. This might reflect the crucial role of avoidance in the maintenance of chronic PTSD (e.g., Salters-Pedneault, Tull, & Roemer, 2004), which had also been found in war veterans (Marshall et al., 2006; Solomon, Horesh, & Ein-Dor, 2009). An avoidance of trauma-related cues, such as places and situations where traumatic events were experienced, or thoughts and feelings related to the traumata, interfere with the extinction of learned emotional associations and, therefore, the traumatic response (e.g., Foa, Steketee, & Rothbaum, 1989).

In accordance with the hypothesis and earlier research (e.g., Köbach et al., 2015; Nandi et al., 2015), trauma exposure during deployment predicted the severity of PTSD symptoms after deployment, whereas violent acts during deployment were not associated with PTSD symptoms. However, the effect of trauma exposure was only small. One possible explanation could be the low rate of trauma exposure during deployment. At the same time, as mentioned before, the soldiers represent a resilient group with a low PTSD burden before the deployment in spite of the high lifetime trauma load.

The missing association between violent acts during deployment and PTSD symptoms provides further confirmation for the hypothesis that the perpetration of violence may not per se be rated as a traumatic experience (Hecker, Hermenau, Maedl, Hinkel et al., 2013). In DSM-IV, an experience was classified as traumatic if it produces feelings of helplessness, horror, or massive fear (American Psychiatric Association, 2002). Self-committed violent acts can therefore represent particular severe traumas. Under certain circumstances however, it can rather produce feelings of lust and excitement, in the absence of a horrified response. Thus, the perpetration of and exposure to violence may not necessarily increase the likelihood of trauma-related disorders (Hecker, Hermenau, Crombach, & Elbert, 2015). It should nonetheless be mentioned that in this study, the rate of reported violent acts during deployment was low, which may have influenced the absent association with PTSD symptoms. However, an effect on appetitive aggression after deployment was found for the same violent acts.

4.3 | The role of unit support

In the past, the phenomenon of groupthink and group cohesion was discussed as a factor enhancing the participation in killings (Dutton, 2007; Elizur & Yishay-Krien, 2009). Based on this idea, we suggested that unit support might enhance the probability for violent acts during deployment. However, this hypothesis was not confirmed. Even though the model revealed a positive trend, it was not significant. Instead, unit support significantly predicted appetitive aggression after the deployment (fighting in groups has a socially rewarding element). As opposed to the assessment of violent acts,

appetitive aggression determines the perception of violent cues and does, therefore, not depend on specific opportunities to commit violence. A strong sense of unit support could encourage a self-given permission to think and feel in a specific manner, therefore, paying a more important role for appetitive aggression as for the actual perpetration of violence. Moreover, groupthink is associated with an illusion of invulnerability, which is also a component of appetitive aggression (Dutton, 2007). A causally opposite explanation—that soldiers high in appetitive aggression perceive and report more unit support—can be neglected, since appetitive aggression before deployment was not associated with unit support.

Whereas unit support during deployment was positively connected to appetitive aggression, it was negatively connected to PTSD symptom severity after deployment and thus might function in supporting resilience against PTSD. This interpretation is in line with conclusions of past research (Brailey et al., 2007; Pietrzak et al., 2010). When taking into account that PTSD symptom severity did not increase substantially between pre- and postdeployment, unit support might even lower pre-existing PTSD symptoms. Berntsen et al. (2012), for example, found different trajectory groups of PTSD symptomatology for deployed soldiers, inter alia a decrease in PTSD symptoms immediately after deployment. The authors suggested that this group might have received more social support during deployment than at home.

4.4 | Limitations

A limitation of the study is the fact that violent acts during deployment were not specifically addressed in terms of duty. However, appetitive aggression and PTSD hyperarousal symptoms could be precisely important for violence perpetrated in excess of the soldiers' duty. Furthermore, the rate of reported violent acts during deployment was low, as was the prevalence of PTSD symptoms, despite the soldiers had been deployed for over a year and had experienced manifold lifetime traumas. An under-reporting of violent acts and PTSD symptoms can therefore not be excluded. Another explanation might be that the year of deployment might have been less eventful regarding traumatic and violent incidences as previously assumed. The Burundian civil war lasted until 2006, thus the deployment in Somalia was not the first combat experience for many soldiers. This indicates that past combats might have influenced their level of appetitive aggression before the deployment. Nevertheless, the study could demonstrate that violent acts during deployment significantly predicted appetitive aggression after deployment, beyond the effect of the baseline level of appetitive aggression.

5 | CONCLUSION

This study prospectively predicted violent acts of soldiers during deployment and enabled these acts to be embedded in an overall structure of the development and maintenance of appetitive

aggression and PTSD symptoms in the war setting. PTSD hyperarousal and an appeal for aggression, thus reactive and proactive mechanisms both contribute to engagement in violent behavior. In war settings, this combination—with trauma on the one hand and appetitive aggression on the other—poses a major risk of escalating violence and impedes peace building in the long term. The stable reciprocal relationship between committing violence and appetitive aggression highlights the decisive role of appetitive aggression in the recurrence and continuation of violence. To resolve this circle of violence, the implementation of prevention programs for soldiers and especially in crisis regions to address mental health as well as appetitive aggression, is imperative.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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