

Controlling Offensive Behavior Using Narrative Exposure Therapy: A Randomized Controlled Trial of Former Street Children

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Abstract

Insecure and violent environments foster two different forms of aggressive behavior: reactive aggressive responding, such as fearful or angry impulsive behavior to perceived threats, and appetitive aggression, which encompasses violence-related feelings of power, excitement, and pleasure. We tested whether forensic offender rehabilitation narrative exposure therapy (FORNET; five sessions) would reduce involvement in everyday violence and produce beneficial effects for mental and physical health. In a Burundian residential center for former street children, we identified a subset of 32 male youths (mean age = 17 years) who scored highly in appetitive aggression. We conducted a randomized controlled trial by assigning matched pairs to receive either FORNET or treatment as usual. During the follow-up (4–7 months after completing treatment), the 16 youths who received FORNET reported having committed significantly fewer offenses (Hedges's $g = 0.62$) and presented with fewer physical-health complaints (Hedges's $g = 0.56$) than did their matched control participants.

Keywords

violent behavior, former street children, narrative exposure therapy, appetitive aggression, traumatic stress

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Aggression is traditionally seen as being driven by negative emotional and motivational states. This could include anger, frustration, or anxiety as a result of exposure to threat, as well as emotional dysregulation in combination with model learning and a lack of alternative strategies for dealing with adversity (Weaver, Borkowski, & Whitman, 2008). This *reactive* form of aggression emerges in response to perceived threats or provocations in the environment and has the objective of averting potential danger (Fontaine, 2007; Kempes, Matthys, de Vries, & van Engeland, 2005; Weierstall & Elbert, 2012). However, recent research with current and former street children and adolescents as well as with former combatants has shown that positive emotions, such as feelings of control, power, and pleasure, are also linked to violent behavior and, thus, pose a risk factor for future aggressive offenses. These initial field studies have suggested that the perpetration of violence or the infliction of harm on a victim for the purpose of experiencing violence-related enjoyment occur frequently enough to be regarded an intrinsic

part of war, as well as being present in civilian life (Crombach & Elbert, 2014; Crombach, Weierstall, Hecker, Schalinski, & Elbert, 2013; Elbert, Weierstall, & Schauer, 2010; Hecker, Hermenau, Maedl, Elbert, & Schauer, 2012). We refer to this form of aggression as *appetitive* aggression.

Elbert et al. (2010) suggested that memory representations in two different associative networks relate to aggression, the *fear or trauma* network and a *hunting or appetitive* network. The fear/trauma network builds up as memories of very stressful, frightening, and traumatic experiences. As a result of a strong physiological stress response, trauma-related perceptual cues, cognitions, emotions, and physical reactions form an associative memory representation. With an increasing number of

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traumatic or fearful experiences, this network becomes disconnected from its original context, that is, the location and time at which the events happened. As each of the events relates to a different time, but all have similar cognitions and emotions, the ignition of just a few elements in the network (e.g., by an everyday cue) may trigger the whole memory representation. The simultaneous lack of contextual representations evokes strong feelings of being under acute threat, helplessness, insecurity, and fear within the individual, and the symptoms of post-traumatic stress disorder (PTSD) arise as a consequence of this (e.g., Elbert, Rockstroh, Kolassa, Schauer, & Neuner, 2006).

In the past few years, research has provided substantial evidence that trauma-related mental disorders are associated with reactive aggression (Conner, Beautrais, & Conwell, 2003; Flannery, Wester, & Singer, 2004; Moretti, Obsuth, Odgers, & Reebye, 2006; Shields & Cicchetti, 1998, 2001; Turnera, Finkelhor, & Ormrod, 2006; Wood, Foy, Layne, Pynoos, & Boyd, 2002). The increasing strength of the associative fear network leads to emotional dysregulation in the form of diminished emotional control, affective instability, and impulsive angry reactions. Furthermore, it reduces the capacity of the individual to process social information. In consequence, affected individuals often perceive everyday cues as threatening and react with aggression characterized by anger and impulsivity (Ford, 2002; Marsee, 2008).

However, perpetrating violence may also be exciting, pleasurable, and fascinating. The release of hormones that cause euphoric emotional reactions and suppress pain (testosterone and endorphins) in combination with stress-related hormones (e.g., cortisol) while overpowering and hurting or even killing an opponent promotes an appetitive processing of violent cues. In consequence, violent cues, such as blood and pain of the victim, become associated with feelings of control, self-efficacy, power, excitement, and pleasure, which builds up to the aforementioned hunting or appetitive network. Regaining control in an insecure and violent environment may be the initial component of this associative memory representation. However, the repeated perpetration of violence may become more and more fascinating, thereby leading to an appetitive perception of aggression (Crombach et al., 2013; Elbert, Hermenau, Hecker, Weierstall, & Schauer, 2012; Hecker et al., 2012). In consequence, cues associated with violence become processed in a positive association network rather than the fear network. Thus, an appetitive perception of violence might serve as a protective factor against the development of trauma-related mental disorders and thereby be a useful adaption in violent and insecure environments (Hecker, Hermenau, Maedl, Schauer, & Elbert, 2013; Weierstall et al., 2013; Weierstall, Schaal, Schalinski, &

Elbert, 2011; Weierstall, Schalinski, Crombach, Hecker, & Elbert, 2012).

Growing up in insecure and violent conditions seems to be a prerequisite for high levels of both reactive and appetitive aggression. Striving to experience positive feelings and self-efficacy in a detrimental environment, and the feelings of power and safety that come along with prevailing in fights, might foster an attraction to violence (Guma & Henda, 2004; Hart, O'Toole, Price-Sharps, & Shaffer, 2007). Given that appetitive aggression constitutes a major risk factor for future violent or bullying behavior, it will impede successful reintegration of former combatants or former street children/adolescents in postconflict societies (Crombach & Elbert, 2014). The higher plasticity of the brain in developing children suggests that they are even more sensitive to acquiring either a strong fear network or an extensive hunting network (Elbert et al., 2006). These two associative networks may even interact, thereby increasing the probability of aggressive behavior. For example, violence-affected children/youths might feel easily provoked and threatened by an everyday cue and therefore react aggressively to defend themselves. While defending themselves, the violent cues might induce an appetitive desire to hurt the opponent, thereby exaggerating the degree of cruelty of the situation. In Figure 1, we used the example of a retaliation script to show schematically how such an interaction might appear. As the cognitive neoassociation theory suggests, behavioral scripts might become integrated into associative networks and be triggered if one of the networks is ignited. Every time the structure is triggered as a whole, the associations become stronger and more difficult to control (for details, see Anderson & Bushman, 2002).

Narrative exposure therapy (NET) has been effectively used during the past decade for children and adults (for details, see Neuner, Catani, et al., 2008; Schauer, Neuner, & Elbert, 2011) to break down the fear network and thereby reduce or even eliminate trauma-related symptoms. NET is a short-term intervention for individuals who suffer from PTSD and other trauma-related symptoms as a result of multiple traumatic experiences. Emerging evidence has suggested that NET is effective even in volatile and insecure settings (for a review, see, e.g., Robjant & Fazel, 2010). Trained local specialists in mental-health care have disseminated it successfully, and laypeople can be trained to administer it. NET can also be effective in a very short form of as little as four to six sessions. All these qualities make it ideal for implementation in postconflict regions with little or no psychotherapeutic support structures (Ertl, Pfeiffer, Schauer, Elbert, & Neuner, 2011; Jacob, Neuner, Mädl, Schaal, & Elbert, 2014; Neuner, Onyut, et al., 2008; Neuner, Schauer, Klaschik, Karunakara, & Elbert, 2004; Schaal, Elbert, & Neuner, 2009). In addition, researchers have reported

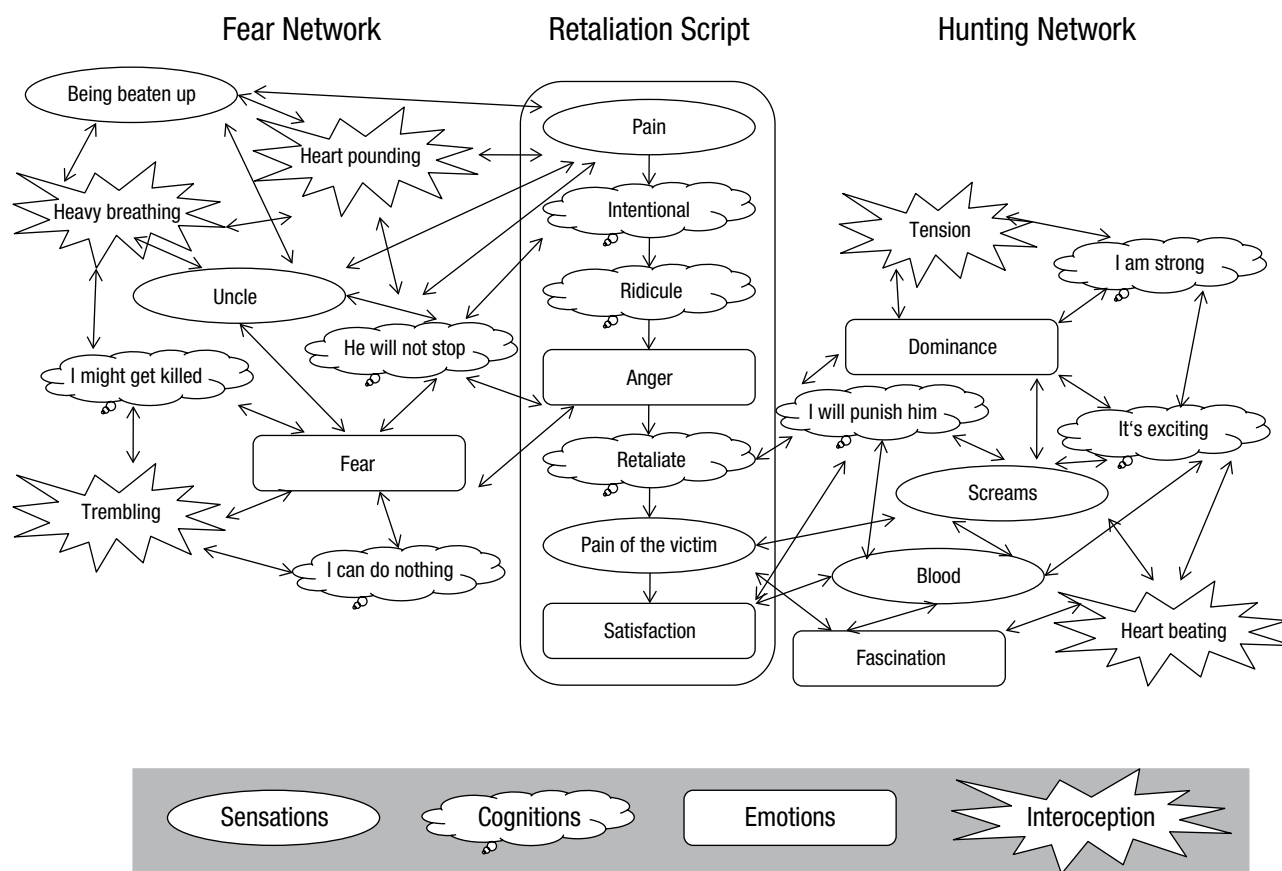


Fig. 1. Schematic representation, using the example of a retaliation script, of the interaction between the fear network and the hunting network that triggers aggressive behavior. A fear/trauma network results from multiple fearful/traumatic experiences: The representation of a single event may well connect to the context and episode. If, however, the perception cues an already existing interconnected network of sensory, cognitive, emotional, and physiological memory representations, it will gain mutual excitatory power while the context gets lost (i.e., codes of the “where” and “when” are not consistently coactivated). Thus, the fear/trauma network becomes disconnected from time and place, and the fear generalizes, thereby giving rise to feelings of impending threat. Narrative exposure therapy is thought to reverse this process by contextualizing the elements of the fear network.

beneficial effects of NET on the physical health of patients (Neuner, Onyut, et al., 2008). Breaking down the fear network reduces the probability of triggering stress-related systems of the body. This prevents the continuous release of stress hormones, which impede the functioning of the immune system (Elbert & Schauer, 2002; Sapolsky, 2004; Sommershof et al., 2009).

NET works by anchoring the context-free sensational cues, cognitions, emotions, and physiological reactions that make up the fear network in the temporal and spatial context of the specific traumatic event. Recounting the event while reexperiencing it in sensu (i.e., while vividly imagining the event) allows the individual to understand and to integrate these cues into autobiographical memory. The associations linked with a traumatic event are thus no longer reactivated and experienced as an ever-present horror but, rather, are anchored properly in a particular time and place in the patient's autobiographical memory (Schauer et al., 2011).

Elbert et al. (2010) postulated that the sensations, cognitions, emotions, and behavior associated with appetitive aggression are encoded in an analogous associative memory representation. On the basis of the assumption that narrative elaboration in sensu may also break down positive affective associations, the forensic offender rehabilitation narrative exposure therapy (FORNET) has been developed (Elbert et al., 2012; Hermenau, Hecker, Schaal, Maedl, & Elbert, 2013). FORNET is an extension of NET. As an additional element, it addresses the perpetration of violence by means of narrative exposure. This intervention aims to help perpetrators to regain control of their violent behavior. In the present study, we aimed to test whether FORNET is also beneficial for those individuals who were both victims and perpetrators in volatile and violent conditions, such as street children/adolescents in postconflict settings, and we adapted the procedure of the FORNET to the needs of this population (for details, see the Method section).

Burundi is a small and densely populated country in East Africa. The country suffered a long and brutal civil war, which officially ended in 2006. The aftermath of this conflict still affects its population in the form of erupting politically motivated violence and severe poverty (Human Rights Watch, 2012; Uvin, 2009). As a consequence of disrupted family structures, intrafamilial property disputes, and famine, the number of street children/adolescents has increased in the capital, Bujumbura. Most of them are boys, who are more often forced to leave their homes, given that they are potential heirs and have more difficulties than do girls finding opportunities to help out as domestic workers (Crombach, Bambonyé, & Elbert, 2014). In the streets, the children/youths struggle to survive and are exposed to high rates of violence (Thomas de Benitez, 2007; Thompson, McManus, & Voss, 2006). Living in the streets also increases the risk of becoming actively involved in violent activities (Aptekar, 1994; Nsengiyumva, 2010). Thus, children and adolescents can be severely affected by both trauma-related mental disorders and appetitive aggression, which augments their potential to engage in violent behavior (Crombach & Elbert, 2014; Hart et al., 2007; McManus & Thompson, 2008).

In Burundi, there is little support for street children or other vulnerable children who grew up in desperate conditions. Only a few residential centers aim to help these children and adolescents reintegrate back into society (Armstrong, 2011). However, in such institutions, even minor offenses and trauma-related symptoms may put the success of the children/adolescents in school at stake, thereby jeopardizing the foundation of a successful reintegration (Crombach et al., 2014). We implemented FORNET in an institution that took care of male children and adolescents who had lived either on the streets or in extremely vulnerable conditions before joining the center. In a randomized controlled trial, we aimed to provide evidence that FORNET reduces appetitive aggression and involvement in everyday violence. Furthermore, we explored beneficial effects on trauma-related symptoms and on physical-health complaints.

Method

Participants

The 32 participants in this study were male children and adolescents living in a residential center for former street children and other vulnerable children without proper homes in Bujumbura, the capital of Burundi. They were originally from provinces all over Burundi. The participants were between 11 and 23 years old (mean age = 17.0 years, $SD = 2.8$) and had lived on average for 5.2 years ($SD = 1.9$, range = 2–10) in the residential center

when this study started. On average, they had successfully completed 6.3 classes ($SD = 2.4$, range = 2–10) in school. Seven participants from the control group and 8 participants from the intervention group had spent up to 60 months in the streets ($MDN = 18$ months). During initial assessment, 3 participants had a PTSD diagnosis. However, only 19% of the participants reported that they did not suffer from any trauma-related symptoms. We did not assess the ethnic background of the participants, given that this has remained a sensitive issue since the civil war. The Burundian society aims to completely abolish racial categories.

Design and procedure

After an initial assessment of all 82 children and adolescents within the center, we initially chose the 42 with the highest scores in appetitive aggression to potentially receive treatment. We matched them for appetitive aggression, PTSD symptom severity, the number of recently committed offense types, age, and street experience. As shown in the consort flowchart of Figure 2, we randomly assigned 1 participant of each pair to the intervention group. The control group received treatment as usual in the residential center. This included educational advice by the educators and psychological counseling by the Burundian psychologist from the center when specific problems emerged. In 4 months, we conducted 16 therapies with the intervention group with the aim of starting with the children and adolescents who scored highest in appetitive aggression. The available capacity for treatment was not sufficient to offer treatment to the remaining potential 10 participants (5 pairs), and they were not further included in analysis. The follow-up assessment took place 4 to 7 months after the completion of the therapies and approximately 12 to 15 months after the initial assessment. As a result of the novelty of the approach, there was not sufficient knowledge for an a priori power analysis. Post hoc power is a function of the p value attained and has not been analyzed (the “power approach paradox”).

The first author (with residence in Bujumbura before and during the period of the assessment and working as the supervising psychologist for the residential center) conducted the initial assessment and the therapies with the help of two German clinical psychologists who had work experience in East Africa. To standardize the form of the assessment and of the intervention, we ensured that the clinicians had practiced in joint interviews and interventions, respectively. Two Norwegian licensed psychotherapists who are specialists in trauma treatment and who had extensive experience working with African refugees and internally displaced people conducted the blind follow-up assessment. All interviews and therapies were conducted with the help of local interpreters who

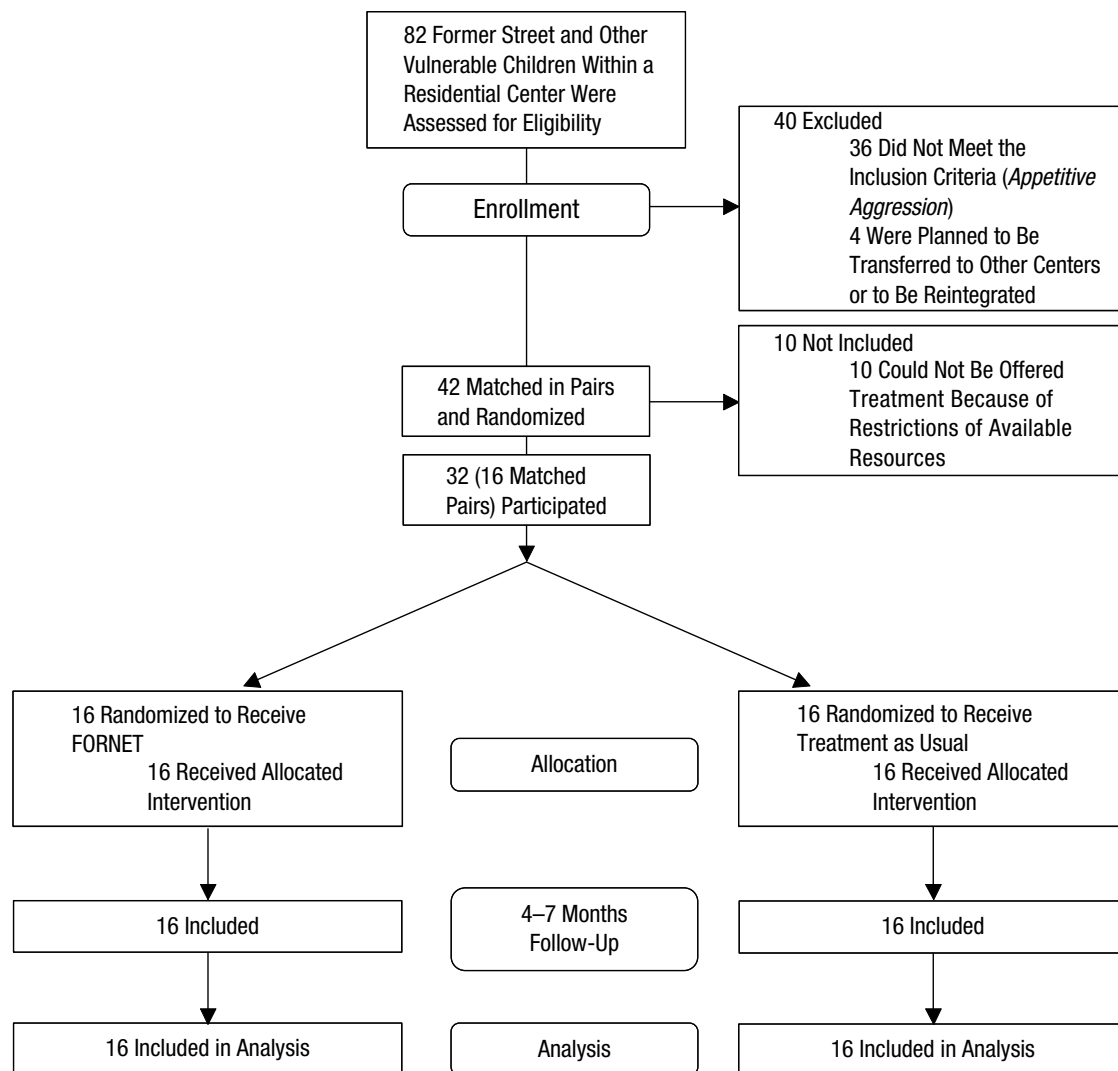


Fig. 2. Flowchart of the participants through the study. FORNET = forensic offender rehabilitation narrative exposure therapy.

had received extensive training in the relevant concepts of mental disorders, aggression, and FORNET. They translated from English or French to Kirundi. The Norwegian psychotherapists and their two local interpreters were not informed about the details of the design of the study and had no information about which intervention each child or adolescent had received. Thus, the assessors were completely blind to the treatment condition during the follow-up assessment.

To guarantee precise translation, we had all instruments used in the two assessments translated from a validated English or French version to Kirundi and back into English or French by different interpreters, and the results of the translation procedure were discussed in detail with

the interpreters before the beginning of the data collection. To guarantee confidentiality, we conducted interviews and interventions individually in calm places in the residential center, in schools, or in rented houses. No other person was present or could listen to the sessions. The children and adolescents were assured that everything they said during the interviews and therapies was confidential and that there would be no negative consequences or punishment for whatever information was given. The pairing of interviewers and translators was continuously rotated.

The study is registered at Clinical Trials (clinicaltrials.gov) with the registration number NCT01519193. The ethical review board of the University of Konstanz

approved the study, and the University Lumière of Bujumbura assisted with the implementation. All participants were appropriately informed about the objectives of the study, about personal risks of participating, that participation was and would remain voluntary throughout the study, and that the data would be used anonymously for scientific purposes and potential publications. All participants gave informed consent before initial assessment and again before the follow-up assessment. Furthermore, the intervention group gave oral informed consent before starting FORNET. In addition, the head of the reintegration center and legal representative of the children and adolescents gave his informed consent for underage participants, given that their familial caregivers either had died or were not available.

Measures

The same interview set was used at both the initial assessment and the follow-up assessment, with minor changes to take the varying situational context of each assessment into account. The data of the initial assessment were used for the assignment of participants to treatment and control groups.

Sociodemographics. The children and adolescents were asked about their background as well as their current social situation. This included questions about their age, education, physical-health complaints during the past 4 weeks (concerning cough/cold, stomach pain, tuberculosis, headache, malaria, pain, diarrhea, fever/shivering, skin rash/scabies, and vomiting; following Neuner, Onyut, et al., 2008), and contact with their family, as well as time spent within the center and in the streets.

PTSD symptoms. The University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index for children and adolescents (Steinberg, Brymer, Decker, & Pynoos, 2004) was used in interview form to assess the exposure to traumatic events and the severity of symptoms of PTSD. The latter is assessed on the basis of the frequency of symptoms reported by children. The occurrence of each *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) symptom within the past month is scored on a scale from *none of the time* (0) to *most of the time* (4). Thus, an overall PTSD severity score can be calculated by summing the symptom scores, which results in a maximum possible score of 68. A PTSD diagnosis was assumed if the *DSM-IV* criteria were fulfilled, including impairment in the daily functioning of the children in response to traumatic stress. The PTSD Reaction Index shows good psychometric properties and has been successfully used and validated in low-income conflict

regions (Catani, Jacob, Schauer, Kohila, & Neuner, 2008; Elbert et al., 2009; Hermenau et al., 2011; Shaw & Harris, 2003).

Recent offenses. The recently committed offenses of the children and adolescents were assessed with an offense checklist. The list consists of 18 items ranging from “I defended myself in a fight” to “I have hurt another person severely/killed another person.” In analogy to a traumatic-event checklist, we assessed different categories of offenses, and not the actual number, during the previous 3 months. The sum score represents the number of different offense types and ranges from 0 to 18.

Appetitive aggression. The children and adolescents’ propensity to perpetrate aggressive acts was assessed by using the Appetitive Aggression Scale (AAS) for Children (AAS-C) and rating how many positive emotions were triggered when the child remembered an offense committed in the past. The AAS-C was based on the AAS for combatants (Weierstall & Elbert, 2011), a semi-structured interview that has been validated with more than 1,600 ex-combatants and has been proved to have good psychometric properties. The AAS contains questions regarding the appetitive perception of aggression. Most of the items of the original version for combatants were rephrased to adapt them to a noncombatant setting and to facilitate the language for the children. Furthermore, the AAS-C included 2 additional items. All items were asked in regard to the last month. Each item is scored on a scale ranging from 0 (*I totally disagree*) to 4 (*I totally agree*). In an assessment with 112 children and adolescents in Burundi, Cronbach’s alpha coefficient as a measure for reliability of the scale was .80. In a principal-axis factor analysis, all items loaded statistically significantly onto a single factor accounting for 23% of the total variance (for details, see Crombach & Elbert, 2014). The instrument is available from the authors on request. To assess the strength of the appetitive emotions, we attempted to trigger them by asking the boys to briefly describe a fight that they had most enjoyed remembering. Then we asked them 8 items about emotions ranging from feeling powerful to the desire to hurt someone and asked them to rate how strongly they felt these emotions in this instant; responses were made on a scale from 0 (*I totally disagree*) to 4 (*I totally agree*). The total sum score of the 17-item scale of the AAS-C and the 8 items of the offense assessment represents the appetitive perception of aggression and ranges from 0 to 100.

FORNET for children and adolescents

Thus far, FORNET has been described only as a therapy for ex-combatants (Elbert et al., 2012; Hermenau et al.,

2013). Although we followed the same principle guidelines, we adapted FORNET to the needs of the children and adolescents in the residential center. For clarity, we detail our approach in the following section and point out the differences between our approach and the FORNET used for ex-combatants. As with the Hermenau et al. (2013) study, the therapy consisted of five individual sessions. Each session lasted between 1 and 2 hr. In contrast to Hermenau et al., we modified the fifth and last session to address the need of the children and adolescents to develop perspectives for the future and to reinforce an associative network of positive emotions with socially acceptable activities. Similar to the rationale of NET, at the end of the therapy, each child received a book with his personal history. Although five sessions proved satisfactory for the majority of the children and adolescents, we offered a sixth session to 2 of the participants. One participant needed an extra session of psychoeducation before we continued the therapy, and another reported the pressing need to complete his personal narration and add further details to his life story.

The first session of the intervention included psychoeducation as well as structuring and gaining an overview of every important emotional event in the life of the child/adolescent with the help of a lifeline. Following NET procedures (Schauer et al., 2011), we had the client symbolize every important experience from his birth to the present along a rope. Flowers represented happy major events and good times in life, whereas stones represented fearful and traumatic events. As a new element of FORNET, the children and adolescents also included situations from their lives in which they perpetrated or were attracted to physical violence of any kind. Those incidents were represented by an additional, neutral symbol—a paper ball—to avoid any *a priori* moral judgment or imposing any particular emotional valence on the violent acts. The therapists ensured that all kinds of violent acts were included, from small physical fights between children to severe offenses. A special emphasis was placed on the most severe violent situations and violent acts that were connected to strong positive (e.g., powerful, exciting) or negative (e.g., angry, fearful) emotions. If the participants reported periods of perpetrating violence (e.g., repeated physical fights in the streets), the first, the most exciting, and the last violent act were symbolized.

The following three sessions continued the NET process (Schauer et al., 2011); the children and adolescents were encouraged by the therapist to report their most arousing experiences in chronological order from birth to present. The therapists slowed the speed of the narration when talking about either a traumatic event (stone) or a violent incident (paper ball). By encouraging the participants to recall and verbalize the traumatic events and violent acts in detail from beginning to end, the therapists

aimed to activate the related associative network (fear network or appetitive network). In this manner, the sensory cues, emotional responses, physiological reactions, and cognitions were embedded in the context and period of the particular event and, thus, disconnected from the corresponding associative network.

During the detailed exposure, the therapists assisted the clients in experiencing emotions, physiological responses, and cognitions by pointing out the similarities and the differences between the present and the past. Recalling a certain event triggered similar emotions, physiological reactions, and cognitions (e.g., “I feel strong and happy even now when I recall this fight,” or “Even now my voice is getting rough when I talk about it”) as well as different kinds of feelings, as the following statement illustrates: “Thinking back is not exciting anymore, it is painful.” Key elements of this therapeutic approach include expressing and accepting unconditionally every emotion—positive or negative—even when the worst offenses were recalled. The therapists supported the clients and did not judge any emotion or action. Nor did they reinforce emotions or actions. Furthermore, the exposure had to be as lively and exciting as possible. Thus, the therapists asked about many details, such as colors of the clothes, where somebody was injured, or how exactly the blood flowed. Moreover, the therapists ensured that the clients talked through the event until its conclusion so that the peak of the intense fear, arousal, or excitement was over and the clients did not end the session with these intense emotions still churning within them. This procedure ensured that cues of the fear network or the appetitive network were embedded in context and period and, thus, when activated, were understood as reminders of past events and not actual reasons for becoming aroused.

In the fifth and final session, the therapists aimed to reinforce feelings of self-efficacy and to link these ideas, as well as feelings of power, enjoyment, pride, and control, to socially accepted cues/activities instead of violent ones. To reinforce a nonviolent positive association network and integrate positive feelings that had been part of the appetitive network, the therapists used a reversed approach of NET. They encouraged the participants to talk about a recent and very exciting moment of their lives in which they felt exhilarated, strong, and powerful. Together with the client, the therapists chose a socially appropriate situation, such as shooting a goal in a football match or succeeding in a school test. However, instead of telling the story until the end, the therapists stopped the narration at the most exciting moment when the client felt most enthusiastic. In such an emotional state, environmental cues of the past and the present become integrated in an associative network (Elbert et al., 2012). Thus, these positive emotions should become more easily accessible,

triggered by socially accepted cues because they are not anchored to any specific time and context, and a generalization in nonviolent surroundings takes place. Whereas in the three preceding sessions, the cues of the appetitive network were strongly associated with a certain context and the combination of cues was made as complex as possible, during the last session, we aimed to relate these appetitive emotions to socially accepted cues to reinforce a positive nonviolent network.

This reversed exposure was part of developing plans for the future and discussing perspectives with the children and adolescents. The fifth session followed the elaboration of the following questions: (a) "What aims and wishes do you have for your future?" (b) "What difficulties and obstacles do you see?" and (c) "What are your personal strengths that will help you to overcome the obstacles and achieve your goals?" During the elaboration of the last question, the therapists encouraged the participants to do the reversed exposure as described earlier. At the end of the fifth session, the therapists summarized the personal strengths of the participant and provided positive feedback to give the child or adolescent a feeling of support and to increase his self-esteem.

Data analysis

The statistical analysis was carried out using SPSS 20.0 (IBM Corporation, Armonk, NY). We used repeated measures analysis of variance to evaluate group differences regarding changes in the number of offense types, appetitive aggression, PTSD severity, and physical health between the initial and the follow-up assessment. To analyze group differences for the follow-up assessment, we used *t* tests and analysis of covariance. Because of the directional hypotheses regarding the effects of the intervention, analyses of interactions and group differences were computed one-tailed on an alpha level of .05. The effect size for pairwise comparisons was estimated using Hedges's *g* (Hedges, 1981). To provide statistics for changes on the individual level, we calculated reliable change indices (RCIs; Jacobson & Truax, 1991) when the interaction effects were significant. We reported the number of participants whose individual scores changed significantly according to the RCIs separately for each group. As a result of directional hypotheses, RCIs higher than 1.65 were counted as significant.

Results

Figure 3 summarizes the relevant results of the intervention effects. The interaction of time and group effects was significant for recent offenses, $F(1, 30) = 3.29$, $p = .040$, $\eta_p^2 = .10$, which indicated that the intervention group had committed significantly fewer recent offenses than had the control group during follow-up, $t(19.26) = 1.81$, $p = .043$.

The effect size, as measured with Hedges's *g* (0.62), was medium sized. Across measurements, appetitive aggression tended to decrease in both groups, as indicated by a weak main effect, $F(1, 30) = 3.98$, $p = .055$, $\eta_p^2 = .12$, and a nonsignificant interaction of time and group effects, $F(1, 30) = 0.72$, $p = .80$, $\eta_p^2 = .02$. The group difference for PTSD symptoms (Time \times Group interaction), $F(1, 30) = 1.09$, $p = .15$, $\eta_p^2 = .04$, did not reach significance, and a time main effect, $F(1, 30) = 6.97$, $p = .013$, $\eta_p^2 = .19$, indicated that, overall, trauma symptoms were rated as more severe during follow-up than during the initial assessment. The physical health of the control group had worsened severely (Hedges's *g* = 1.15), whereas there was no such change in the intervention group during follow-up assessment—Time \times Group interaction: $F(1, 30) = 5.54$, $p = .016$, $\eta_p^2 = .14$; time main effect for physical health: $F(1, 30) = 12.30$, $p \leq .001$, $\eta_p^2 = .29$. Given that the groups were not perfectly matched for physical-health complaints, we assessed the difference in the follow-up with an analysis of covariance by taking into account the number of physical-health complaints at the initial assessment as a covariate. As predicted, the intervention group suffered significantly less from physical-health complaints than did the control group, $F(1, 29) = 3.56$, $p = .035$, $\eta_p^2 = .11$. This effect was large enough to make a difference in daily life, as confirmed by the medium effect size of Hedges's *g* (0.56).

We found similar results on the individual level: In the intervention group, 5 participants reported a significant reduction of committed recent offenses during the follow-up assessment; only 2 individuals reported significantly more recent offenses. In the control group, 3 participants significantly improved, whereas 5 had committed more offenses than during the initial assessment. With regard to physical health, 7 individuals in the intervention group reported amelioration and 8 individuals reported deterioration. However, within the control group, no one reported amelioration, and 13 participants reported suffering significantly more from physical complaints than during initial assessment.

Discussion

The results of the study indicate that FORNET is a potentially effective intervention for reducing violent behavior. The recent involvement in different kinds of violent behavior was significantly reduced within the children and youths who had received the specific treatment compared with those who had not. Thus, this study shows that a detailed discussion of violent behavior without judging or stressing moral opinions is not only possible with youths but also reduces their involvement in everyday violence.

Although the effects of the intervention were as expected on the behavioral level, the children and youths

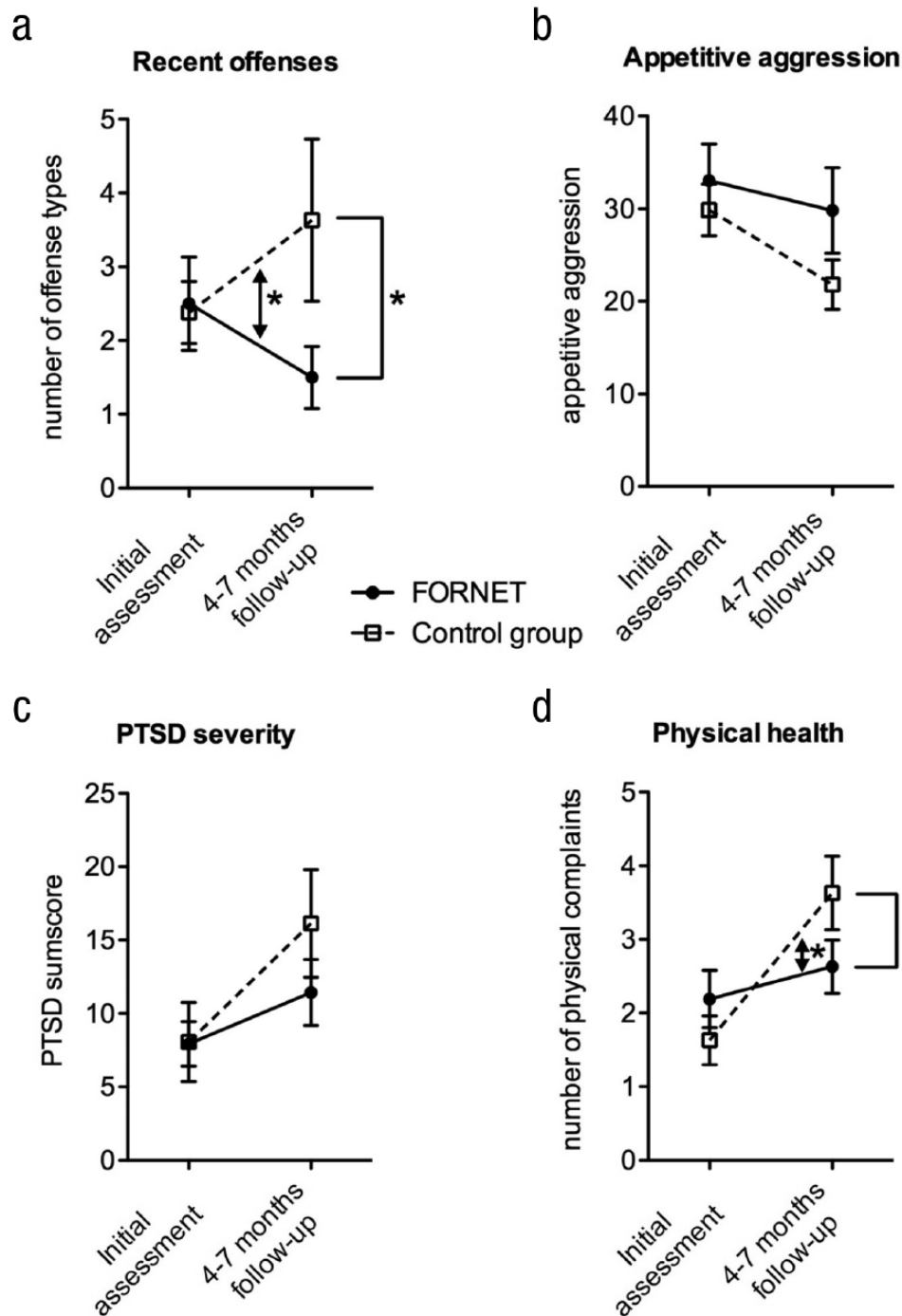


Fig. 3. Group differences in the follow-up assessment and in the development patterns of the sum scores of (a) recent offenses, (b) appetitive aggression, (c) posttraumatic stress disorder (PTSD) severity, and (d) physical health between the initial assessment and the follow-up. Means are displayed for each group at both time points. Error bars represent standard errors. Asterisks indicate significant differences. Open squares/dashed lines represent the control group; filled circles/solid lines represent the intervention group. Vertical arrows combined with asterisks highlight significant differences between interactions of time and group effects.

in the treatment group did not significantly differ in the change of appetitive aggression from those in the control group. Thus, although both groups still rated aggressive acts as equally appetitive during follow-up, it seems that

the treatment group simply would not act out such aggression. It is possible that children and youths who received the treatment became more aware of their partially positive emotions regarding violent behavior as

they were talking about them during the intervention. Even though participants in the intervention group reported a similar attraction to aggression as did those in the control group, the awareness of their emotional responses might have helped them to better control their violent behavior, which would be reflected by their lower involvement in recent violence. The finding is consistent with the results of Hermenau et al. (2013), who also did not observe a FORNET-dependent change on the AAS among former child soldiers. It is possible that passion for violence can be channeled away from violent acts and into more socially acceptable forms, such as sports.

According to the results of the study, many children and adolescents reported a greater severity of PTSD symptoms as well as more physical-health complaints during the follow-up assessment. However, at the follow-up assessment, the children and youths who received FORNET suffered less from physical-health complaints than did those in the control group. At least on the descriptive level, we could observe a similar pattern for the PTSD symptoms.

We had not expected to find an overall deterioration in mental and physical health between the two assessment periods. One major factor was probably the different degree of openness of the children between the initial assessment and the follow-up. Moreover, an increased feeling of general insecurity and perceived stress during the period of the follow-up assessment might have driven the overall increase in PTSD symptoms. The center was preparing to move to another location at the end of the school year. This was also the period for reintegration. Many children and adolescents felt severely threatened by these changes in their life. This might have triggered and reinforced their current PTSD symptoms (Crombach et al., 2014).

This study provides evidence for beneficial mental- and physical-health effects of FORNET. With regard to PTSD symptoms, we found that participants who had received an intervention seemed less affected in the follow-up assessment than did those in the control group, but the interaction failed to reach significance. However, it should be noted that children and adolescents were chosen for participation in the study because of their high scores in appetitive aggression, irrespective of PTSD-symptom levels, which were negligible in a number of cases. The significantly reduced number of physical-health complaints of the participants in the FORNET group, compared with those in the control group, is consistent with previous observations that narrative trauma interventions may have beneficial effects on physical health, even in unstable and insecure environments (Neuner, Onyut, et al., 2008; Pennebaker, 1997). Children and youths who have been exposed to traumatic stressors are especially vulnerable to feeling easily threatened

by daily hazards as a result of a diminished ability to process social information and a very sensitive stress response system (Ford, 2002). As a consequence, insecure environments would maintain the stress response system in a state of continuous activation. The prolonged exposure to stress-related hormones and especially glucocorticoids (Steudte et al. 2011) would then lead to a suppression of the immune system and, thus, to an increased risk for physical illness (Gunnar & Quevedo, 2007; Miller & Rasmussen, 2010; Sapolsky, 2004; Sommershof et al., 2009). FORNET reduces the sensitivity of the stress response system by embedding trauma cues in a specific context and period and by diminishing the stress reaction to certain cues through exposure in sensu. By disconnecting cues from the fear/trauma network, FORNET prevents daily stressors and minor violent experiences from reactivating trauma-related emotions, cognitions, and physical reactions (Crombach et al., 2014). In consequence, the stress response system is no longer continuously activated and physical health improves.

Although this study provides evidence that FORNET can be an effective approach for reducing the involvement of children and adolescents in everyday violence, the exact mechanism by which this has been achieved remains to be detailed. Apart from addressing appetitive aggression, one aim of FORNET is to reduce the severity of stress reactions and thereby emotional dysregulation in the form of irritability and impulsive aggressive behavior. Thus, the effect on the behavioral level might be a reflection of perceptions of the environment as less threatening.

A limitation of this study is the reliance on self-reports. At the time of our assessment, other measures were not available. For example, with regard to the current health of the participants, there were no medical records detailed enough to meet the requirements of our study. In particular, the assessment of aggression is thereby potentially biased as a consequence of norms of the society and the susceptibility to giving socially desirable answers. This bias would have been the case in both groups, however. The reporting of aggressive behavior and positive emotions toward violence requires trust; thus, participants might have been more open about their behavior and emotions during the follow-up assessment. Assuming that this openness might have been greater in the experimental group than in the control group, it would have diminished rather than produced the group difference.

We have assumed that humans are biologically prepared to develop appetitive aggression (Elbert et al., 2010). This is particularly the case if children, during their development, grow up in insecure conditions and are exposed to domestic and peer violence (Crombach & Elbert, 2014; Nandi, Crombach, Bambonyé, Elbert, & Weierstall, 2014). Elevated appetitive aggression, in turn,

increases the risk for violent and criminal offenses. The interaction between social and biological reward mechanisms that contribute to the development of an appetitive perception of violence needs further research. Candidate social factors include self-committed offenses, exculpatory beliefs, and violence-accepting environments. A wealth of data, albeit correlational in nature, has suggested that these factors exert their effects at any developmental period in life but with a particularly strong impact during childhood. Biological reward mechanisms related to dopamine, endorphins, and testosterone are mediators in this process and would need to be assessed with regard to their association with experiencing violence and developing appetitive aggression (Elbert et al., 2010; Elbert et al., 2012). A model of this process might provide insights into potential ways to reverse this process or at least to establish inhibition of these driving forces for criminal behavior. The central questions that thus remain concern how to teach potential violent offenders (a) to regulate their desire for aggressively acting out; (b) to interrupt the forcing up of aggression through the self-rewarding perception of mobbing, harassing, chasing, and defeating others (Crombach & Elbert, 2014); and (c) to ultimately unlearn or depress the reward inherent in appetitive aggressive behavior. Among other directions for future research, subsequent studies need to assess how contextualizing appetitive aggressive cues and reconnecting rewarding emotions with socially acceptable activities may interact to diminish involvement in violent offenses.

Author Contributions

Both authors developed the study concept and contributed to the study design. A. Crombach coordinated the project, performed a large number of the initial assessments and interventions, and organized the follow-up assessments. A. Crombach analyzed and interpreted the data and drafted the manuscript under the supervision of T. Elbert. T. Elbert critically revised the manuscript and wrote the grant applications to achieve funding for this project. Both authors approved the final version of the manuscript for submission.

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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