

EMPIRICALLY GROUNDED CLINICAL INTERVENTIONS

Long-term effects of psychotherapy in a context of continuous community and gang violence: changes in aggressive attitude in high-risk South African adolescents

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Abstract

Background: Post-traumatic stress but also aggressive attitudes and behaviour can be found in adolescents living in a context of ongoing community and gang violence in the low-income urban areas of Cape Town, South Africa.

Aims: We investigated the long-term effects (15–20 months after therapy) of (a) Narrative Exposure Therapy for Forensic Offender Rehabilitation (FORNET) and (b) the cognitive behavioural intervention ‘Thinking for a Change’ (CBT) on post-traumatic stress disorder (PTSD) and aggression compared with a waiting list.

Method: Fifty-four young males participated in the treatment trial, of which 17 completed the FORNET intervention, 11 the CBT intervention, and 26 were on a waiting list. The primary outcome was the change score for the Appetitive Aggression Scale; secondary outcomes were the PTSD Symptom Scale-Interview change scores, and the number of perpetrated violent event types.

Results: The reduction in scores for PTSD that had been observed in FORNET completers at the first follow-up were still significant at the second long-term follow-up (Cohen’s $d = 0.86$). In this treatment arm (FORNET), the scores for appetitive aggression were also significantly reduced (Cohen’s $d = 1.00$). There were no significant changes observed for CBT or for the waiting list.

Conclusions: The study indicates that FORNET can successfully reduce post-traumatic stress as well as the attraction to violence even for individuals living under conditions of continuous traumatic stress.

Keywords: aggression; CBT; FORNET; gang violence; PTSD

Introduction

The low-income urban areas of Cape Town (e.g. Gugulethu, Khayelitsha) are characterized by a climate of violence. In 2016, there were 184 murders per 100,000 inhabitants in Gugulethu (South African Police Service, 2016) compared with 6.2 murders per 100,000 inhabitants in cities of the United States (Criminal Justice Information Services Division, 2016). The leading cause of death for adolescents aged 15–19 was murder (Groenewald *et al.*, 2008). From an early age, South African adolescents from the low income urban areas are confronted with physical, sexual and emotional abuse and neglect by community as well as family members (Kaminer *et al.*, 2013).

Post-traumatic stress symptoms become increasingly prevalent (Catani *et al.*, 2009) under these living conditions of continuous traumatic stress. Drugs might in some cases also be abused to suppress painful memories and intrusions (Rosenkranz *et al.*, 2014). In the face of such adverse conditions shaped by continuous threat of severe violence, juveniles instinctively tend to seek protection, which for some of them results in joining street gangs in their early adolescence (Burton, 2007). An adaptation from victim to offender might entail advantages for those who start to feel attracted to violence.

So-called appetitive aggression (Elbert *et al.*, 2018) falls into the category of instrumental aggression and is described as the violence-related enjoyment a perpetrator gains by his or her act of inflicting harm on others (Elbert *et al.*, 2010). While reactive aggression is of a defensive, affective and retaliatory nature, appetitive aggression is more proactive, predatory, and goal-directed. The possible advantages of an attraction to violence in low-income urban South African communities were investigated by Weierstall *et al.* (2013) in a sample of 69 ex-offenders; their research revealed that participants scoring high with regard to appetitive aggression showed better functioning (despite the presence of post-traumatic stress symptoms) and expressed fewer concerns about future threats in comparison with adolescents who only exhibited reactive aggression.

Consequently, most of these adolescents constitute both an offender as well as a victim side, which needs to be addressed in potential interventions (Seedat *et al.*, 2009). Interventions seeking to support such young men should therefore take both aspects into account: the traumata the clients have suffered on the one hand and the inflicted violence on others on the other hand (Stenmark *et al.*, 2014).

Narrative exposure therapy (NET), a trauma-focused exposure treatment, has been adapted to address the specific needs in the treatment of violent offenders by including exposure sessions for their committed crimes. The aim of *NET for Forensic Offender Rehabilitation* (FORNET; Elbert *et al.*, 2012) is to mitigate the psychological consequences of chronic trauma exposure (such as intrusions, hypervigilance and avoidance) as well as to reduce criminal attitudes and behaviour. FORNET has proven to be successful in the reduction of committed offences and physical health complaints in former Burundian street children (Crombach and Elbert, 2015), as well as in the reduction of post-traumatic stress disorder (PTSD) symptoms in Congolese ex-combatants (Hermenau *et al.*, 2013; Köbach *et al.*, 2015b). The level of attraction to aggressive behaviour was also markedly reduced after FORNET in a study conducted by Hermenau *et al.* (2013). In this study, however, the improvements were found in both the therapy and the control condition; the authors trace this result back to a general beneficial change in the participants' living conditions, as part of the transition from a militia setting to a civilian population.

Other promising offender-oriented programmes include those that address the offenders' thinking, such as cognitive behavioural therapy (CBT; Wikström and Treiber, 2008). The aim of CBT is to correct deficient, dysfunctional or distorted cognitions that may lead to criminal acts. One of the many CBT approaches in use is called 'Thinking for a Change' (TFAC; Bush *et al.*, 1997, 2011), which has been shown to be as effective as other CBT interventions in reducing recidivism (Landenberger and Lipsey, 2005). Positive results in terms of reductions in criminal behaviour have also been reported in the studies of Golden *et al.* (2006), and Lowenkamp *et al.* (2009), who were working with male and female adults. Bickle (2013) asserts that TFAC interventions may lead to an increase in social skills as well as a decrease in the acceptance of criminal behaviour.

The present study investigates the long-term effects of FORNET and CBT on symptoms of PTSD, aggressive attitude and behaviour in a sample of juvenile and adult offenders from the low-income urban areas around Cape Town. It constitutes an extension of an earlier report in which the results of the first follow-up demonstrated that exposure-based interventions can successfully reduce PTSD symptoms 8 months post-therapy in a context of continuous

Table 1. Demographic variables of sample including differences in between-treatment conditions

Demographic variables	FORNET (<i>n</i> = 17) Mean (SD), [range]	CBT (<i>n</i> = 11) Mean (SD), [range]	Waiting list (<i>n</i> = 26) Mean (SD), [range]	H (2) ¹
Age	23.53 (5.62), [18–40]	23.82 (2.93), [20–30]	20.89 (4.53), [14–34]	7.31*
Years of formal education	10.88 (1.96), [7–16]	10.18 (1.47), [7–12]	9.89 (2.29), [1–13]	1.17
Participation REALISTIC programme	14 (82.35%) [<i>n</i> (%)]	9 (81.82%) [<i>n</i> (%)]	10 (38.46%) [<i>n</i> (%)]	2**
Traumatic events pre score	23.18 (4.26), [17–32]	21.91 (5.61), [9–29]	20.65 (3.95), [11–27]	3.29
PTSD symptom pre score	21.12 (9.16), [8–37]	20.64 (6.38), [9–29]	16.85 (7.14), [8–30]	3.13
Appetitive aggression pre score	24.82 (8.69), [13–38]	30.18 (13.30), [13–49]	24.54 (12.91), [12–91]	1.78
Offence types committed pre score	7.77 (4.96), [1–17]	7.00 (5.06), [1–17]	7.42 (4.97), [1–17]	2.22

¹Kruskal-Wallis test, ²Fisher-Freeman-Halton test, two-sided; SD, standard deviation; PTSD, post-traumatic stress disorder; **p* < 0.05, ***p* < 0.01.

stress (Hinsberger *et al.*, 2017). The long-term effects are presented on average 17 months post-treatment. The hypotheses were:

- A decline in PTSD symptoms in the FORNET group in comparison with the CBT group and a waiting list. As TFAC (CBT) has no specific trauma focus, it was used as a control group to FORNET to dismantle the active factors of effective psychotherapy.
- A decline in appetitive aggression in the treatment groups (both FORNET and CBT) in comparison with the waiting list; and
- A decline in committed violent event types in both treatment conditions (FORNET and CBT) in comparison with the waiting list.

Method

Participants

Young males from the low-income urban communities Gugulethu and Khayelitsha in Cape Town, South Africa, were recruited via the Rebuilding And Life Skills Training Centre (REALSITIC). REALISTIC offers programmes for young ex-prisoners and adolescents at risk of drug dependency or involvement in criminal gangs. The final sample that served as the basis for the data analysis consisted of 54 male participants. The age range was 14–40 years (mean = 22.3, median = 21, *SD* = 4.8). Of the participants, 61% had attended the 6-month REALISTIC re-integration programme. The average time spent in school was 10.3 years (*SD* = 2.1, range = 1–16); however, 87% of the sample had dropped out of school before graduating. See Table 1 for a summary of the demographic variables of the sample.

Procedure

In the period from October 2013 to November 2014, 405 male South Africans were pre-assessed by structured interviews. Because the participants' native language was isiXhosa and the interviewers spoke English, back-and-forth translations of the questionnaires were used to generate bilingual surveys. Four South African counsellors (specially trained in the concepts of mental disorders, trauma and clinical diagnosis) and four German clinical psychologists carried out the initial assessments. Trained interpreters (native isiXhosa speakers who were fluent in English) accompanied the English-speaking interviewers so that interviewees would feel comfortable speaking in either English or isiXhosa based on their personal preference. Cross-interview consistency and mental hygiene (self-care) was ensured by regular individual and team supervision.

The Ethical Review Boards of Stellenbosch University, South Africa, the University of Cape Town, South Africa, and the University of Konstanz, Germany, approved the study protocol and consent forms were signed by all 405 interviewees (or, in the case of under-age participants, by their legal representatives). The consent forms notified participants that data would be collected anonymously and that confidentiality was guaranteed. The reimbursement for each interview was ZAR100, which equals US\$8.50.

The exclusion criterion for the therapy study participation was acute psychosis. The inclusion criteria for participation in the study, which reduced the remaining sample to 89 participants, were a minimum of 8 points on the PTSD symptom scale (PSS-I) and a minimum of 9 points on the scale for appetitive aggression (AAS); these are comparable to the inclusion criteria in the FORNET study of Köbach *et al.* (2015b). The first therapeutic intervention started in December 2013 and the last camp took place in November 2014.

The first follow-up interviews took place 7–11 months (mean = 8.1 months) after therapy, and the second 15–20 months (mean = 16.6 months) post-therapy. Follow-up interviews were conducted by five German clinical psychologists and a trained South African counsellor, all experienced in conducting interviews in an African context.

Measures

Post-traumatic stress symptom severity

Foa and Tolin's PTSD Symptom Scale-Interview (PSS-I; Foa and Tolin, 2000) was used to measure post-traumatic stress severity according to the DSM-IV (American Psychiatric Association, 2000). The PTSD assessment was keyed to the most traumatic event in the participants' past (which could either be a self-experienced event or a self-committed violent event). All 17 symptoms were rated from 0 (= 'not at all/only once') to 3 (= 'five or more times per week/almost always') and were summed up to represent the severity of PTSD (maximum score: 51 points). Change scores resulted from the subtraction of the post-therapy score from the pre-therapy score, such that a positive score represents an improvement (decrease) in terms of PTSD severity and a negative score represents the worsening of (increase in) PTSD symptoms. The PSS-I has previously been used in other African samples (e.g. Köbach *et al.*, 2015a). The PSS-I exhibited a high inter-rater reliability coefficient of 0.93 and sufficient internal consistency, with a Cronbach's alpha coefficient of 0.86 (Foa and Tolin, 2000). In this study, Cronbach's alpha was 0.88.

Appetitive aggression

Appetitive aggression was measured with the Appetitive Aggression Scale (AAS; Weierstall and Elbert, 2011). Responses were rated on a 5-point Likert scale (0 = 'disagree completely' to 4 = 'agree completely') and summed up, with a maximum score of 60 points. Change scores were calculated in accordance with PTSD change scores. The AAS has demonstrated good psychometric properties in various violent populations, and its internal consistency is sufficient, with a Cronbach's alpha coefficient of 0.85 (Weierstall and Elbert, 2011). For this study, Cronbach's alpha was 0.86.

Perpetrated violence

Perpetrated violence (also referred to as self-committed crime) was measured with a list of 21 different offence types (1 = 'yes'/0 = 'no') that was adapted from the AAS and has previously been successfully administered in a population of South African juvenile offenders (Weierstall *et al.*, 2013). The items reflect a range of violent acts, including less severe aggression ('Have you shouted at someone?'; 'Have you slapped someone?') as well as severe criminal acts ('Have you killed someone?'; 'Have you raped someone?'). The maximum sum score was 21 points. Change scores were calculated as above. In the current study, the Kuder-Richardson's alpha was 0.90.

Study design

Twenty participants each were randomly assigned to the FORNET and CBT interventions, 13 were allocated to the 'camp' waiting list. Matching criteria were (1) post-traumatic stress symptom severity, (2) the level of appetitive aggression, and (3) the severity of their suicidality. Thirty-five participants eligible for inclusion, who were unable to participate in the treatment phase, were assigned to a second waiting list ('no camp') in order to preserve these participants for follow-ups and data analysis. As the German interviewers who conducted the pre-assessment were not blind to the later treatment allocation, the follow-up interviews have been conducted by different assessors.

The training for the FORNET and CBT therapists included prior theoretical training on both assessment and intervention theory and was placed in field practicum internships where they had to demonstrate skill and knowledge uptake in a practice setting. After being selected they received further advanced training in either FORNET or CBT and had opportunities to role-play or conduct a therapy under supervision.

The data analysis utilized both between- and within-subject comparisons. The primary outcome variable was the change score on the Appetitive Aggression Scale; secondary outcome variables were the change scores for the PTSD Symptom Scale-Interview, and the number of perpetrated violent event types.

Interventions

After a failed attempt to administer therapy in an office setting (about 90% drop-out rate), the therapy programme was conducted in several 3-week camps in order to provide participants with a safe and drug-free environment, nutrition, and shelter, thus ensuring that therapy motivation would not be undermined by any of these factors. The camps each consisted of 12 to 14 study participants as well as various staff (social workers, facilitators, cooks, security). Therapists and interpreters visited the camps daily during the week to conduct the therapy sessions. The use of separate therapy rooms on the camp premises guaranteed confidentiality and privacy. All camp participants were allowed to participate in the free-time activities offered by the camp facilitators (non-therapeutic interventions such as soccer games, beach walks, etc.). The FORNET interventions were conducted by four German and two South African narrative-exposure therapists and the CBT sessions by three South African behaviour-modification therapists; all practitioners had extensive theoretical and practical training in the respective manual-based interventions. Therapy sessions were conducted in English with the support of interpreters. Each participant had the same therapist–interpreter pair over the entire course of therapy.

Narrative exposure therapy for forensic offender reintegration

The manual-based intervention (further details in Hecker *et al.*, 2015) consisted of eight individual sessions of about two hours each; participants had a therapy session every second working day. The first FORNET session begins with psycho-education on post-traumatic stress symptoms and the purpose and procedure of the intervention. In the same session, therapy starts by chronologically reconstructing the participant's biography by means of a life-line. In the six exposure sessions that follow, participants are confronted with the most traumatic experiences and the most violent incidents *in sensu*. During exposure sessions, the therapist guides the participant through an incident by continually asking for the participant's context-specific information/sensory perceptions, cognitions, feelings and physiological responses. In the last session, the participant creates another life-line in order to integrate memories that only appeared over the course of the therapy. The therapy ends with an outlook of the future and the participant's expression of his hopes. The efficacy of FORNET is based on the process of expressing what has happened. It is supposed that this process leads to memory re-organization and inhibition,

cognitive restructuring and re-evaluation; it also provides the participant with recognition (by the therapist) of personal trauma (Schauer *et al.*, 2011).

Cognitive behavioural therapy

CBT is constructed around the concept that cognition affects behaviour and that individuals have the capacity to monitor and adapt their modes of thinking and thus how they act (Beck *et al.*, 1976, 1983). The specific standardized CBT intervention that this study employed is entitled 'Thinking for a Change' (Bush *et al.*, 1997, 2011). It focuses on cognitive restructuring of the thoughts and attitudes that put one at risk of engaging in harmful or criminal behaviour, as well as on improving problem-solving and social skills. The programme consists of 22 short sessions, which were condensed to seven sessions of two hours on average so that the time frame for the FORNET and CBT programmes would be comparable. The therapy starts with psycho-education and an introduction to the study rationale. Sessions 2 and 3 focus on cognitive self-change (understanding how thoughts determine behaviour, raising awareness of one's mind and emotions and finding new ways of thinking), session 4 includes instruction in certain social skills (understanding and responding to the feelings of others, especially anger, and dealing with accusations), and sessions 5 and 6 explore problem-solving behaviour (interruption of impulsive behaviour, problem description, gathering information, goal setting, and evaluation of plans). Participants are asked to complete homework between sessions that is reviewed at the start of the next session. The final session evaluates and concludes the therapy. In contrast to FORNET, the cognitive restructuring that CBT employs is concentrating on events that are currently important and not necessarily events from the past that were traumatizing.

Waiting lists

In this study, there were two separate waiting lists. The first waiting list consisted of participants who stayed at the therapy camp but did not receive any intervention (*waiting list 'camp'*). However, these participants could take part in the free-time camp activities. The second waiting list consisted of all those participants who were unable to take part in the three-week camps (*waiting list 'no camp'*).

Data analysis

Eight participants' values were missing from the second follow-up as a result of non-attendance (two from the FORNET, two from the CBT and four from the waiting list condition). The missing data were completed using the last-observation-carried-forward method (LOCF), which generally gives a conservative estimate of effect sizes. The method also has the advantage of minimizing the number of subjects excluded from the analysis, and it allows readers to more easily identify the limitations of the model and the analyses.

Because the outcome variables violate the assumptions for parametric analysis in terms of normal distribution and homogeneity of variance, all statistical methods employed were non-parametric (using SPSS version 23). The assessment of group comparisons was conducted using the Kruskal–Wallis and Friedman tests; *post-hoc* tests used were the Mann–Whitney *U*-test and Wilcoxon's signed-rank test. Between-group comparisons were rated significant at a 5% level, further corrected (Bonferroni adjustment for alpha-error accumulation) to $p < 0.017$; within-group comparisons to $p < 0.025$. Cohen's *d* effect sizes between 0.2 and 0.49 indicate a small effect, 0.5 to 0.79 a medium effect, and >0.79 a large effect; effect size *r* is considered small at values between 0.1 and 0.29, medium between 0.3 and 0.49, and large when the value is >0.49 (Cohen, 1988).

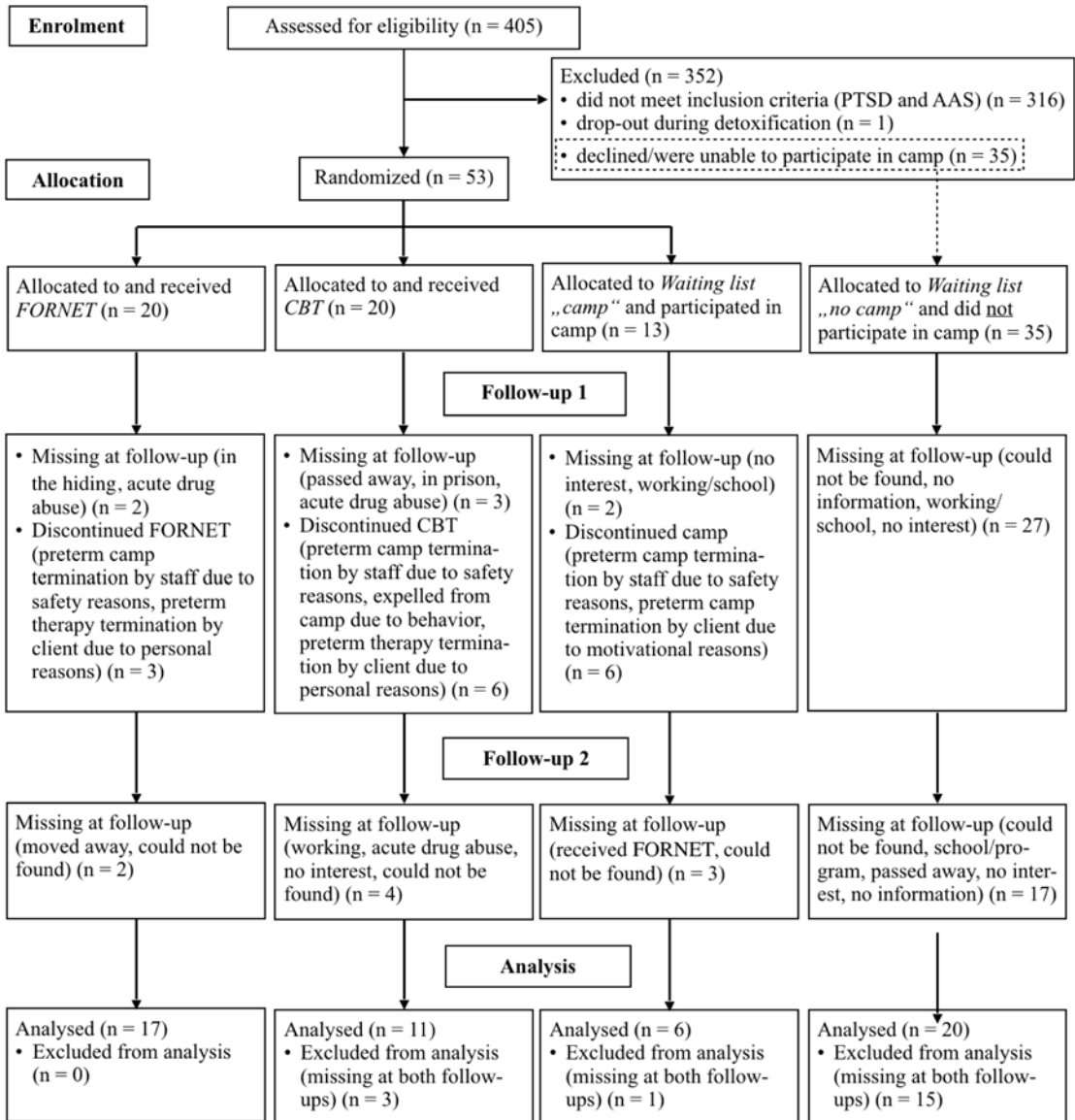


Figure 1. Flow chart of the participants over the course of the study. PTSD, post-traumatic stress disorder; AAS, Appetitive Aggression Scale; FORNET, Forensic Offender Rehabilitation Narrative Exposure Therapy; CBT, cognitive behavioural therapy. The reason ‘could not be found’ encompasses a variety of issues (mostly participants that had given wrong names at the first interview; other reasons were homelessness, in hiding or in prison, moved away, or unavailable at home).

Results

Flow of participants

Figure 1 shows a summary of the flow of participants. In total, there were 16 drop-outs. Eleven drop-outs resulted from the termination of an entire therapy camp because weapons had been found in the camp. As all three treatment conditions were affected by the camp closure, these drop-outs can be considered non-systematic. There were two further drop-outs (one each from FORNET and CBT) due to personal reasons, one drop-out due to lack of motivation (waiting list), and one participant (CBT) had to be expelled from camp due to repeated behavioural problems.

Table 2. Therapy outcome (pre to post2) for all treatment conditions

Treatment conditions	FORNET			CBT			Waiting list		
	Pre Md Mn (SD)	Post2 Md Mn (SD)	Change pre to post2 Md, [CI] z, Cohen's <i>d</i>	Pre Md Mn (SD)	Post2 Md Mn (SD)	Change pre to post2 Md, [CI] z, Cohen's <i>d</i>	Pre Md Mn (SD)	Post2 Md Mn (SD)	Change pre to post2 Md, [CI] z, Cohen's <i>d</i>
PSS-I	24 21.12 (9.16)	13 13.65 (12.27)	8 [1.88-13.06] -2.30* -0.86	23 20.64 (6.38)	11 18.55 (17.89)	5 [-8.7-12.89] -0.40 -0.24	16.5 16.85 (7.14)	16 17.62 (13.28)	2 [-5.86-4.32] -0.27 -0.11
AAS	24 24.82 (8.69)	16 18.65 (13.06)	7 [2.11-10.24] -2.61** -1.00	28 30.18 (13.30)	24 24.91 (15.56)	4 [-7.07-17.62] -1.20 -0.78	23 24.54 (12.91)	18.5 19.31 (11.85)	6.5 [-1.16-11.62] -1.54 -0.63
Committed offence types	8 7.77 (4.96)	10 9.88 (3.30)	-3 [-5.08-0.85] -1.96 -1.08	5 7.00 (5.06)	9 9.64 (6.73)	-2 [-6.09-0.82] -1.43 -0.96	7 7.42 (4.97)	5 6.12 (4.96)	1 [-1.36-3.97] -0.70 -0.28

FORNET, Forensic Offender Rehabilitation Narrative Exposure Therapy; CBT, cognitive behavioural therapy; Md, median; Mn, mean; SD, standard deviation; CI, confidence interval for mean value; *z* and Cohen's *d*, effect size; PSS-I, PTSD Symptom Scale-Interview; AAS, Appetitive Aggression Scale; * $p < 0.05$, ** $p < 0.01$.

Two participants from the 'camp' waiting list received FORNET interventions at a later point in time and thus switched from the waiting list to the FORNET group.

Non-completers were excluded from the analysis in order to maintain a preferably unclouded outcome for therapy efficacy, as were 19 participants who did not appear at the first and the second follow-up (three from CBT, one from the 'camp' waiting list, 15 from the 'no camp' waiting list). Ultimately, 54 participants were included in the data analysis: 17 from the FORNET group, 11 from CBT, six from the 'camp' waiting list, and 20 from the 'no camp' waiting list. Due to the small size of the 'camp' waiting list, the two waiting lists were combined into one.

Pre-treatment, there were no significant group differences (see Table 1) between any of the three treatment conditions with regard to years of formal education ($H(2) = 1.17$, $p = 0.561$), the level of trauma exposure ($F(2) = 3.29$, $p = 0.192$), post-traumatic stress symptom severity ($H(2) = 3.13$, $p = 0.213$), appetitive aggression ($H(2) = 1.78$, $p = 0.414$), or perpetrated violence during one's lifetime ($H(2) = 2.22$, $p = 0.331$) or in the 6 months before therapy ($H(2) = 0.17$, $p = 0.919$). The participants in the CBT group were older than those on the waiting list ($z = -2.49$, $p = 0.017$). The number of participants who had taken part in the REALISTIC re-integration programme differed between the treatment conditions (Fisher-Freeman-Halton test, $p = 0.005$, two-sided): most of the participants in the FORNET and CBT groups had been involved in the re-integration programme, whereas most of the waiting list participants had not (see Table 2).

Long-lasting reduction in PTSD symptoms

The mean score for the pre-treatment PTSD severity for the complete sample was 18.96 ($SD = 7.83$, $range = 8-37$) on the PSS-I, and 53.7% of participants met the criteria for a PTSD diagnosis. To determine whether the reduction in PSS-I scores in the FORNET group that was observed at the first follow-up (on average 8 months after therapy) was still persistent about 9 months later (on average 17 months post-treatment), a Wilcoxon's signed-rank test was employed and showed a significant within-subject drop in PTSD symptom severity for FORNET participants ($z = -2.3$, $p = 0.025$, $r = -0.39$, Cohen's $d = -0.86$), a non-significant within-subject drop in the CBT group ($z = -0.40$, $p = 0.668$) and in the waiting list ($z = -0.27$, $p = 0.786$, see Fig. 2)

Table 3. Participant distribution over the different treatment conditions and re-integration programme participation

Re-integration programme	Psychotherapy		No therapy	Total
	FORNET	CBT	Waiting list	
Yes	14	9	10	33
No	3	2	16	21
Total	17	11	26	54

FORNET, Forensic Offender Rehabilitation Narrative Exposure Therapy; CBT, cognitive behavioural therapy.

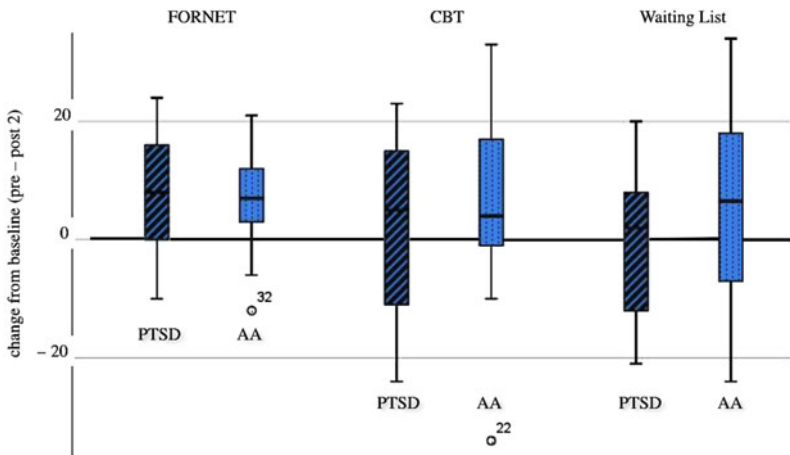


Figure 2. Median change scores for PTSD symptom severity and appetitive aggression (AA). Whiskers represent a confidence interval of 95%; FORNET, Forensic Offender Reintegration Narrative Exposure Therapy; CBT, cognitive behavioral therapy (‘Thinking for a Change’).

Reduction in appetitive aggression

The average score for attraction to cruel behaviour before therapy was 25.78 (*SD* = 11.83, range = 9–52) for the sample. Wilcoxon’s signed-rank test achieved statistical significance for the within-subject comparison of the FORNET group (median_{pre} = 24, median_{post2} = 16; *z* = -2.61, *p* < 0.01, *r* = -0.45, Cohen’s *d* = -1.00), but not for the CBT group (*z* = -1.21, *p* = 0.229) or the waiting list (*z* = -1.54, *p* = 0.117).

No change in perpetrated violence

The average number of committed offence types was 7.44 (*SD* = 4.89, range = 1–17) in this population. There was neither a significant reduction nor an increase in committed offence event types for any of the three treatment conditions or over time.

Influence of participation in a re-integration programme

Because most of the therapy attendees had also participated in a re-integration programme, it is necessary to investigate the potential influence of the REALISTIC re-integration programme on the outcome variables. Comparisons of participants who neither received a therapy intervention nor took part in a re-integration programme with those participants involved in both therapy and

the re-integration programme or either only therapy or the re-integration programme were conducted. The results showed that those involved in both programmes showed a significant difference in criminal behaviour in comparison with those taking part in none of the offered programmes (Mann–Whitney *U*-test: $z = -2.89$, $p < 0.01$). A Wilcoxon's signed-rank test reveals that this difference is due to an increase in criminal behaviour in those attending both therapy and re-integration programme ($z = -3.01$, $p < 0.05$), whereas the number of offence types did not change in the group not attending any programme (see Table 3).

Discussion

The reduction in PTSD symptom levels that was observed in the FORNET group at the first follow-up (about 8 months post-therapy) was still significant about one and a half years after therapy. These outcomes indicate that FORNET is not only a feasible intervention for young men at risk (of both trauma exposure and violence perpetration) but also achieves positive long-term results in terms of post-traumatic stress reduction, even for individuals who continue to live in unsafe conditions. The lasting reduction in PTSD over time in the FORNET group is in line with findings from previous FORNET studies (Hermenau *et al.*, 2013; Köbach *et al.*, 2015b). Notably, the latest follow-ups in those studies were 12 months post-treatment; this study is the first to investigate therapy outcomes on average 17 months after treatment.

By the comparison of a trauma-specific approach (FORNET) with a non-trauma-specific approach (CBT), it is possible to gain a deeper understanding of the actual effective factors responsible for a positive therapy outcome. CBT reached a small but not significant reduction in PTSD symptoms, which once more indicates the relevance of a trauma-specific approach that focuses on the reorganization of the trauma memory.

In the FORNET group, the young men's attraction to violence did not alter in the first few months post-therapy, but changed significantly over a longer period of time. One possible explanation might be that a change in attitude (in this case, attraction to cruelty) takes more time than changes in a fear-network (and the associated post-traumatic stress symptoms). In contrast to Hermenau *et al.* (2013), where the reduction in appetitive aggression was most likely due to a change in context (from an area plagued by conflict to a safe area) and the rehabilitation programme received, in this study, the change in appetitive aggression was proven to be possible in a context of ongoing violence.

It is unclear why there has been no significant reduction in the AAS score for participants of the CBT group. Eventually, the compression of the time frame (from 22 weekly 1-hour sessions to seven 2-hour sessions over 3 weeks) has been an unhelpful adaptation of the TFAC programme, because the therapy session content and the homework that the participants get may need a longer time frame to effectuate changes.

Violence perpetration was not reduced in any of the treatment conditions. The reduction in criminal behaviour that was achieved in the Burundian FORNET study (Crombach and Elbert, 2015) might have been supported by the change in the environment of those participants – a change that did not occur for the South African participants of this study. These observations suggest that those participating in both programmes met and socialized with peers that share the same aggression-oriented attitude and thus continued to reside in a social context that generally accepts or even values criminal behaviour (Wikström, 2006). The restored psychological functioning after recovery from PTSD might even have contributed to more engagement in the group's activity. This points at the importance and influence of social contacts and social acknowledgement on treatment outcome (Sommer *et al.*, 2017a, 2017b). In addition to the social contacts, the lack of safety and of resources in this context may also explain why these young males had little choice to reduce their criminal activities.

Limitations

This study is limited by a missing *a priori* power analysis as well as its sample size, reducing the study's statistical power. On the other side, treatment changes that survived the robust (non-parametrical) testing may be substantial. The investigated convenience sample may restrict the generalizability of the study outcome for gang members in townships or low-income suburbs.

Although all interviewers received the same training for the conduction of the interview questions as well as supervision to improve inter-rater consistency, inter-rater reliability has not been measured and therefore differences in the rating can not be precluded.

Our drop-out rate of 29% falls in the middle of drop-out rates in studies with comparable samples (e.g. Golden *et al.*, 2006: 38%; Bickle, 2013: 18%), and although drop-outs occurred equally in all three treatment conditions, they may have distorted the outcome.

This investigation concentrated on the long-term effects of therapy outcomes, with a second follow-up after an average of 17 months post-treatment. The advantage of long time intervals for follow-ups is that information can be obtained about the potential duration of therapy effects. The disadvantage is that other factors may come into play, and it becomes more difficult to evaluate the acute efficacy of the therapy.

Conclusion

The main conclusions to be drawn from this research trial with high-risk South African youth are (a) a trauma-specific approach is needed for the effective reduction of PTSD symptoms, (b) long-term success of trauma-focused interventions can be achieved even in a context of ongoing threat, and (c) the reduction of appetitive aggression can be successfully achieved even in a context of persistent violence. We conclude that the treatment of post-traumatic stress is feasible in areas of ongoing violence and that it even can be realized for high-risk adults who are involved in criminal gang structures and drugs. However, a change in context (e.g. change in contact with the former gang) may be necessary to reduce criminal offences. Thus future research must focus on the preconditions necessary for the prevention of recidivism and in particular the role that social acknowledgement plays in this triangular relationship.

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