In search of links between social capital, mental health and sociotherapy: A longitudinal study in Rwanda

Femke Verduin a, b, *, Geert E. Smid c, d, Tim R. Wind b, d, Willem F. Scholte a, b, d

a Academic Medical Center, Dept. of Psychiatry, University of Amsterdam, Amsterdam, Netherlands
b Equator Foundation, Diemen, Netherlands
c Foundation Centrum '45, Diemen, Netherlands
d Arq Psychotrauma Expert Group, Research Program, Diemen, Netherlands

Article info
Article history:
Received 26 October 2013
Received in revised form 25 September 2014
Accepted 29 September 2014
Available online 2 October 2014

Keywords:
Rwanda
Social capital
Post-conflict
Mental health
Sociotherapy
Latent growth modeling

ABSTRACT
To date, reviews show inconclusive results on the association between social capital and mental health. Evidence that social capital can intentionally be promoted is also scarce. Promotion of social capital may impact post-conflict recovery through both increased social cohesion and better mental health. However, studies on community interventions and social capital have mostly relied on cross-sectional study designs. We present a longitudinal study in Rwanda on the effect on social capital and mental health of sociotherapy, a community-based psychosocial group intervention consisting of fifteen weekly group sessions. We hypothesized that the intervention would impact social capital and, as a result of that, mental health.

We used a quasi-experimental study design with measurement points pre- and post-intervention and at eight months follow-up (2007–2008). Considering sex and living situation, we selected 100 adults for our experimental group. We formed a control group of 100 respondents with similar symptom score distribution, age, and sex from a random community sample in the same region. Mental health was assessed by use of the Self Reporting Questionnaire, and social capital through a locally adapted version of the short Adapted Social Capital Assessment Tool. It measures three elements of social capital: cognitive social capital, support, and civic participation. Latent growth models were used to examine whether effects of sociotherapy on mental health and social capital were related.

Civic participation increased with 7% in the intervention group versus 2% in controls; mental health improved with 10% versus 5% (both: \( p < 0.001 \)). Linear changes over time were not significantly correlated. Support and cognitive social capital did not show consistent changes.

These findings hint at the possibility to foster social capital and simultaneously impact mental health. Further identification of pathways of influence may contribute to the designing of psychosocial interventions that effectively promote recovery in war-affected populations.

Trial registration: Nederlands Trial Register 1120.

1. Introduction
Traumatized survivors of war or political violence often have complex mental health problems, with anxiety, depressive and cognitive disturbances (De Jong et al., 2003; Rodin and van Ommeren, 2009). Most patients also suffer from feelings like shame, guilt, distrust and alienation. Such feelings complicate social functioning and interpersonal contacts in communities where social structures and cohesion have already been damaged by human violence (Ager, 2002; Hobfoll et al., 2007). Psychological and behavioral problems hamper daily functioning and the engagement in relations. Learning how to cope with such difficulties may not only counter individual suffering, it may also help to prevent additional damage in social relations caused by ongoing behavioral disturbances, and to rebuild meaningful social structures in which people can re-find and practice (self)respect. Social capital is potentially a key resource supporting post-conflict recovery. Promotion of social capital may impact post-conflict recovery both through increased social cohesion and through better mental health (Scholte and Ager, 2014). This study explores the possible effects of an intervention called sociotherapy on social capital and
mental health in post-genocide Rwanda. We hypothesized that this intervention would impact social capital and, as a result of that, mental health.

1.1. Social capital

Social capital is a concept based on the idea that social networks provide a basis for social cohesion and cooperation. It has been characterized as ‘the glue that holds societies together’ (McKenzie et al., 2002). Social capital’s most commonly adopted definition in health sciences recognizes five characteristics: community networks, civic engagement, civic identity (belonging, solidarity, equality), reciprocity and norms of cooperation, and trust in the community (Putnam, 1993). Within the literature, studies distinguish between individual and collective conceptualizations of social capital (Kawachi and Subramanian, 2006), but the definition as a community asset is currently “privileged” over individual definitions.

Social capital has been divided into two components, ‘structural social capital’ and ‘cognitive social capital’. Structural social capital refers to the existence of relationships, networks, and associations that link members together. Cognitive social capital is the ‘driving force’; it includes values, norms, civic responsibility, expected reciprocity, charity, altruism, and trust. Structural and cognitive social capital, respectively, can be characterized as what people ‘do’ and what people ‘feel’ in terms of social relations (Harpham et al., 2002).

1.2. Promotion of social capital

Until recently, the few existing studies on community interventions aiming to improve social capital, tended to rely on cross-sectional study designs. This implies that their ability to draw causal inferences has been limited (Macinko and Starfield, 2001; De Silva et al., 2005a). Only very few longitudinal studies evidence that social capital can be fostered by interventions. Coletta and Cullen (2000) discussed changes in social capital resulting from violent conflict in their study of four conflict-affected countries (Cambodia, Rwanda, Guatemala, and Somalia); they provide clear examples of how governments and international actors promote decentralization, civic participation, social inclusion, empowerment, and the strengthening of grassroots movements. A study by Michael et al. (2008) showed social support and self-rated health improved, while depressive symptoms decreased, after a community-based participatory research intervention, which employed Community Health Workers who used popular education to identify and address health disparities in Latino and African American communities in a metropolitan area in the United States.

Brune and Bossert (2009) performed a longitudinal study in Nicaragua, showing that systematic interventions promoting management and leadership development were effective in improving some aspects of social capital, in particular the cognitive attitudes of trust in the communities. Interventions were also linked to higher levels of civic participation in governance processes. As in other empirical studies, they also found that higher levels of social capital were significantly associated with some positive health behaviors.

Pronyk et al. (2008) conducted an intervention in rural South-Africa that combined group-based microfinance with participatory gender and HIV training in an attempt to catalyze changes in solidarity, reciprocity and social group membership as a means to reduce women’s vulnerability to intimate partner violence and HIV. After two years, adjusted effect estimates indicated higher levels of structural and cognitive social capital in the intervention group than the comparison group, although confidence intervals were wide.

1.3. Social capital and mental health

Social capital may play a role in the incidence and prevalence of mental illness (McKenzie et al., 2002). The assumed relevance of social capital for mental health has been underscored by national and international policies to develop social capital in disaster- or war-affected communities (Hobfoll et al., 2007; Norris et al., 2008). Over the last decade literature on the salutary association between social capital and mental health is growing (Kawachi and Berkman, 2001; Almedom, 2005; De Silva et al., 2005a; De Silva et al., 2007; Engström et al., 2008; Berry and Welsh, 2010; Hamano et al., 2010; Suzuki et al., 2010; Wind et al., 2011). However, systematic reviews of quantitative studies examining the association between social capital and mental illness have shown inconclusive results (De Silva et al., 2005a,b; Islam et al., 2006). Especially studies that conceptualized social capital as a community asset (as opposed to an individual asset) found ambiguous associations with individual mental health outcomes (De Silva et al., 2005a,b; Hamano et al., 2010; Eriksson, 2011). At the individual level, several studies have observed positive associations with better mental health (Veenstra, 2000, 2002; De Silva et al., 2005a,b; Whitley and McKenzie, 2005; Almedom, 2005; Irwin et al., 2008; Patel, 2010).

A study in Rwandan children and families affected by HIV/AIDS showed that communities which ‘gather people together to discuss problems’, ‘offer advice’ and ‘understand and help solve problems’ add to individual coping and strong parent–child relationships in protecting against mental health problems and promoting resilience (Betancourt et al., 2011). A recent study among war-affected youth in Sierra Leone revealed the role of the post-conflict social context in shaping mental health in former child soldiers. Findings underscored the importance of the social environment and the need to develop post-conflict interventions that address community-level processes in addition to the needs of families and individuals (Betancourt et al., 2014).

Various scholars (Wang et al., 2009; Nakaia and Arnold, 2010; Wind and Komproe, 2012) assert that the time has come to shed more light on possible associations between social capital and mental health, and which specific starting points are most important for interventions.

1.4. The present study

The study presented here was performed within the framework of a psychosocial community intervention (community-based sociotherapy) aimed to enhance social bonding (Richters et al., 2005). Sociotherapy has been shown to establish a significant improvement in mental health in Byumba, Rwanda (Scholte et al., 2011a).

Byumba province is located in the north of Rwanda, bordering Uganda. The invasion by the Rwanda Patriotic Front (RPF) from Uganda into Rwanda on 1st October 1990 started a civil war in the north of the country. Predominantly of Tutsi origin, many of the members of the RPF were second generation refugees who had fled to Uganda and settled there from 1959 onwards, escaping ethnic purges in Rwanda. The RPF went into Rwanda as an army of liberation but was perceived by the majority of the population (mostly of Hutu origin) as an army of occupation. Low intensity fighting was interrupted by several massacres, including one in Byumba. During the 1994 genocide, social capital atrophied as the country, communities and families fell prey to hatred and violence (Coletta and Cullen, 2000). The war (1990–1994) and genocide (1994) related problems affected men and women of all ages. The
population experienced atrocities like killings, sexual violence, torture, intimidation, robbery, destruction of property, and social rejection, leaving the community in a state of trauma. A relatively large part of the population came to consist of widows, widowers, orphans, physically handicapped, prisoners and ex-prisoners (Richters et al., 2005, 2008).

Clearly, after years of war and genocide, Rwanda is a context where social fabric has been seriously damaged, which implies low social capital. Before the genocide, potential bridging social capital existed in the form of exchange, mutual assistance and reciprocity (Coletta and Cullen, 2000). The ‘success’ of the genocide depended in part on civilians’ sense of civic duty and on the historical strength of the central government. Vertical social capital, manifested in almost absolute state power, had historically penetrated Rwandan society so deeply as to supersede horizontal relations or loyalties. The violent conflict destroyed whatever broad-based forms of social capital had existed (Coletta and Cullen, 2000; Putzel, 1997).

To our knowledge, our study is the first aiming to establish possible links between social capital and mental health by use of a longitudinal design. We measured social capital at the individual level, and looked into what elements of social capital were promoted by the community-based sociotherapy program in Rwanda, and if these elements were salutary for mental health. First, we performed an exploratory factor analysis of the scores on the instrument used to measure social capital, in order to distinguish the relevant elements of social capital. Then we explored the change over time in these elements, and examined the relationship between the changes in social capital and mental health. Latent growth models (LGM) were used to examine whether the effects of sociotherapy on three elements of social capital were related to the effects of sociotherapy on mental health.

2. Methods

Data were collected at the start of the intervention (October 2007: T0), directly after (January 2008: T1), and at eight months follow-up (September 2008: T2). Demographic data (sex, age, education level and socioeconomic status) were documented. Approval was gained from the Medical Ethics Committee of the Academic Medical Center in Amsterdam. Trial Registration: Nederlands Trial Register (NTR) 1120.

2.1. Intervention

Sociotherapy seemed to be an approach that could promote social capital by creating meaningful social structures in which people can re-find and practice (self)respect. The method therapeutically uses interaction between individuals and their social environment to help subjects to re-assess and re-define values, norms, relations and possible collaborations. The principal premise is that reaching a certain level of mutual respect, trust and care in group interaction would help to increase the problem solving capacity and subjective mental health in individual group participants (Scholte et al., 2011a).

In sociotherapy with survivors of systematic violence, safety and the setting of democratic rules are additional primary objectives. Key elements of the working methods in Rwanda were debates and the exchange of experiences and coping strategies among participants, exercises, games and mutual practical support. The approach did not primarily aim at sharing or processing traumatic memories. Trauma symptoms were addressed through psycho-education and advice.

The sociotherapy programme was set up in collaboration with the Episcopal Church of Rwanda (ECR), funded by the development organization Cordaid and technically supported by the Dutch agency Equator Foundation. Approval was given by regional and national authorities in Rwanda. Wide support on community level was gained through public acclamation by the ECR (Richters et al., 2008).

The programme was open to any adult (≥ 16 years old) wanting to participate. Groups contained ten to twenty participants and were mostly mixed: both sexes, various ethnic backgrounds, wide age distribution, who lived in close proximity to one another (Richters et al., 2013). Forty-five groups ran simultaneously, having weekly meetings over a period of fifteen weeks, lasting three hours each. Group leaders were local people, familiar with the region’s history and current living situation; they had secondary school level education and worked as teachers, pastors, local leaders, civil servants or as staff of non-governmental organisations (NGOs). They had received a three months’ training from Equator staff, to lead participants through six phases of sociotherapy, safety, trust, care, respect, rules and memories. During their training, group leaders had been guided through these phases as if they were sociotherapy beneficiaries themselves. At the end of each session a joint reflection was prompted on their experiences and the working methods that had elicited these experiences.

Group leaders were allowed to attune the working methods to the characteristics of their groups (e.g., degree of trust, nature of problems) and to their own affinity and experience, putting different emphases on elements like rules, role plays, and spirituality. The groups were held in a private, undisturbed place, where all participants could sit down. Democratic rules were applied, and men and women were treated equally: so were younger and older people.

2.2. Instruments

2.2.1. Mental health

To measure mental health we used the Self Reporting Questionnaire (SRQ-20), an instrument developed by the World Health Organization (WHO) for screening for common mental disorders in primary health care settings. It consists of twenty yes/no questions about mood, thinking capacity, feelings of anxiety and physical well-being. ‘Yes’ answers result in a higher score, meaning a poorer mental health condition. We (back-) translated the SRQ-20 to the local language, Kinyarwanda, and validated it for the actual context (Verduin et al., 2010). The capacity of the SRQ-20 to identify probable psychopathology proved to be sufficient for men (area under the curve: AUC = 0.74) and women (AUC = 0.76). Reliability was considered to be good (Cronbach’s alpha = 0.83). We also validated the SRQ-20 for its capacity to assess change in symptom severity over time. The factor structure of the SRQ-20 was determined through exploratory factor analysis. Factorial invariance over time was tested in a multigroup confirmatory factor analysis using data of repeated measures (re-assessment after a 3-month period) of 230 respondents. The instruments factor structure proved to be time invariant; the number of factors, factor loadings and covariances of factors remained equal over time (Scholte et al., 2011b).

2.2.2. Social capital

There is a large variety in the elements of social capital studied in the various research projects published, depending on which distinction or element of social capital is considered most important. We chose to make use of the short version of the Adapted Social Capital Assessment Tool (Short A-SCAT; Tuan et al., 2005), because of its proven validity in various contexts, its limited length and the presumed relevance of its items for the Byumba context. Items of the Short A-SCAT address received support from groups or
individuals, whether and how people connect with leaders, how they feel connected to others in their living area and how they get along.

The Short A-SCAT has been extensively validated in two resource-poor settings (Vietnam, Peru). Due to time and financial constraints, we could not validate our Rwandan version in the same scrupulous way. However, before we used the Short A-SCAT, it was discussed in focus groups, tested and discussed with our interviewers. There was overall agreement on the changes to be made in the phrasing of items in order to capture the intended meaning in an easy to understand way for local respondents. For example: the word ‘community’ was changed to ‘area, neighborhood or hill’; the word ‘majority’ was changed to ‘many people’, as the term had been contaminated during ethnic polarization; in the question ‘are you an active member of any group?’ the word ‘active’ was discarded because it appeared to be too ambiguous and would probably bias responders towards answering ‘yes’.

After a pilot study, we added some new items in order to raise the instrument’s psychometric qualities, providing more response options for giving and receiving support and for manifestations of civic participation. Also, Likert scales were used instead of yes/no options, which allowed for a more differentiated response (See Supplementary data) (Verduin et al., 2010).

2.3. Participants

We calculated that a minimum of thirty respondents was needed to establish a 2.7 effect with a standard of 0.80 power. As at T0 an unexpected high number of sociotherapy group participants appeared to be willing to be included in the study and as we were unsure about the future attrition rate, we decided to aim at larger numbers (n = 100) per study group.

2.3.1. Experimental group

The programme was open to any adult (≥16 years) wanting to participate. It is likely that particularly persons with psychosocial problems were inclined to apply. Also, community members could personally be invited when considered psychosocial problem cases by sociotherapy group leaders. Out of forty-five sociotherapy groups simultaneously starting sessions, ten groups which in total contained an equal number of men and women, were selected in rural as well as urban areas. We then formed our experimental study group by randomly selecting 100 out of the total of 133 participants of these ten groups.

2.3.2. Control group

We applied the following procedure to compose a control group that was equivalent at baseline with regard to our main outcome measure, the SRQ-20 score. During our pilot study, 2.5 times more respondents in the experimental group had baseline scores above cut-off than in the control group (Scholte et al., 2011a). For this study we therefore aimed to interview 2.5 times (n = 250) more respondents than in the experimental group, to later select 100 out of these to compose a control group. We identified regions within Byumba district where the programme was not or had not been running so far, or for practical reasons would not start over the upcoming eight months. Here, we selected respondents through convenience sampling; interviewers started at the top of a hill or in the center of a village and each walked down a different footpath towards scattered houses or huts. An equal number of men and women, at home or in the fields, were randomly chosen and asked to participate. Finally 251 respondents were interviewed.

After analysis of the data collected, we selected a group of 100 out of these for which the distribution of SRQ-20 scores matched that of the intervention group. For this purpose we used eight clusters of scores (0–1, 2–3, 4–5, 6–7, 8–9, 10–12, 13–15, 16–20) and from each cluster randomly selected a number of respondents equal to the corresponding cluster in the experimental group. Next, we matched clusters on age, and subsequently on sex as much as possible. The final selection of 100 constituted our definite control group.

2.4. Interviews

Eight local interviewers were recruited; all were sociology students at the ‘Institut Polytechnique de Byumba’ in Byumba. Their one-week training addressed the principles of a longitudinal study design, interviewing techniques and our measuring instrument (Verduin et al., 2010; Scholte et al., 2011a). Informed consent was obtained from respondents by use of an explanatory text, which because of the high illiteracy rate was read aloud. In case of refusal, demographic data and reasons for refusal would be requested and documented, but no-one refused. The interviews were mostly held outside, or inside a local church; interviewer and respondent would find a private spot where they could not be overheard by anyone. After the interview a small amount of money, 500 Rwandan francs (0.50 Euros), was given to compensate for the time the respondent usually had to wait.

2.5. Statistical analysis

All psychometric and validation analyses were performed using SPSS 18. AMOS was used to conduct latent growth modeling.

Before descriptive and inferential analysis (means, standard deviations (SD), t-tests, chi square tests, correlations), data were screened for normality in distribution; skewness and kurtosis values were between −2 and 2. Missing values were handled using full information maximum likelihood (FIML) estimation (N = 200 for all analyses). It has been shown that under ignorable missing data conditions, FIML estimates are unbiased (Enders and Bandalos, 2001).

2.5.1. Descriptive and factor analysis

We used descriptive analyses (means, SD) to evaluate possible changes over time in elements of social capital. Exploratory factor analysis was performed to distinguish which elements of social capital were measured by the Short A-SCAT in our Rwandan context.

2.5.2. Latent growth modeling

We applied latent growth models (LGMs) to variables that showed possible changes over time. LGMs can be extended to include structural parameters as predictors (Duncan et al., 2006). Thus, we examined the relationship between predictor variables (i.e., sociotherapy), baseline level, and linear change in each variable separately. We then examined the association of components of social capital and mental health over time using associative LGMs. Associative LGMs allow researchers to examine the correlations among development parameters for pairs of behaviors. We added sociotherapy as a predictor variable to the associative LGM to examine the effects of sociotherapy on mental health and civic participation simultaneously. We evaluated model fit using the discrepancy $\chi^2$, comparative fit index (CFI), non-normed fit index (NNFI(TLI)), root-mean-square error of approximation (RMSEA), and Akaike information criterion (AIC). Models that fit adequately are indicated by CFIs and NNFIs $\geq 0.95$ and RMSEAs $\leq 0.06$ (Hu and Bentler, 1999).
3. Results

3.1. Baseline characteristics

The two study groups matched on SRQ-20 score distribution, age and sex at baseline (see Table 1). We compared study participants who completed all three assessments with those who dropped out after the first or second assessment on all variables assessed at T0.

Drop out did not differ significantly between the experimental and the control group ($p = 0.79$). Drop-outs at T1 or T2 from either study group did not differ significantly in sex, age or level of education. Neither was there a difference in sex, age, level of education, SRQ-20 scores and scores on Short A-SCAT between actual respondents and drop-outs at T1 and T2. A difference between the study groups was noted in socioeconomic status (SES) at baseline (see Table 1).

3.2. Reliability and factor analysis of the short A-SCAT

Our adapted version of the Short A-SCAT had reasonable psychometric qualities. Using the total sample at baseline ($N = 384$) and after reversing question 19, Cronbach’s alpha was 0.75 for the instrument as a whole; it did not improve if any item was deleted.

Earlier factor analyses of the Short A-SCAT in Peru and Vietnam (by de Silva and colleagues) yielded three factors: cognitive social capital, group membership/(social) support and citizenship (Harpham et al., 2002; Tuan et al., 2005; De Silva et al., 2005b).

An exploratory factor analysis showed our version of the Short A-SCAT fell apart into similar components as described above. Item 1 was omitted because it had a different response format (yes/no question) and therefore did not load on one factor specifically.

I. Cognitive social capital (items 11 and 14, 15, 16, 17, 18, 19; Cronbach’s alpha = 0.86);
II. Support (items 2, 3, 4, 5a, 6a, 7a, 8a; Cronbach’s alpha = 0.68);
III. Civic participation: items 9, 10, 12, 13. Cronbach’s alpha = 0.63).

These three factors accounted for 44.8% of the total variance. The items can be categorized in three sections; cognitive social capital and two elements of structural social capital: support manifestations and civic participation. The term support represents distinct manifestations of received support; help from groups or individuals in comforting/encouraging in good or bad situations, in improving one’s economic situation and in knowing and doing things (See Supplementary data). We prefer the term civic participation over
citizenship (De Silva et al., 2005b), as it entails an active attitude towards one's community. The items in our scale of civic participation address joining elections and actively discussing and solving problems with local leaders or in groups, respectively (See Supplementary data).

### 3.3. Descriptive analyses and correlations of social capital and mental health

Table 2 shows mean scores, standard deviations, and bivariate correlations of the three measurements of mental health (SRQ-20 scores), cognitive social capital, support and civic participation, for both the experimental and the control group. Mean scores did not appear to change consistently over time, except for mental health and civic participation in the experimental group. See bold numbers in Table 2; in the experimental group, mean SRQ-20 scores showed a 10% decrease (from 8.41 at T0 to 6.31 at T2), while the control group showed a 5% decrease (from 8.26 to 7.72) (p < 0.001). For civic participation there was a 7% increase of mean scores (from 6.59 to 7.78) versus a 2% increase (from 7.4 to 8.03) in the control group (p < 0.001).

### 3.4. LGM results

Table 3 shows model fit indices of subsequent LGMs. Each individual model showed a good fit. Results of the final associative LGM of mental health and civic participation with sociotherapy group membership as a predictor variable are reported in Fig. 1 and Table 4. The results showed a significant effect of sociotherapy on both linear change in mental health and civic participation (Fig. 1: −0.38 for mental health and 0.41 for civic participation). In addition, civic participation at baseline was lower in the sociotherapy group than in the control group. Although mental health and civic participation were correlated at baseline (Fig. 1: −0.26), linear changes in mental health and civic participation over time were not significantly correlated (−0.21).

### 4. Discussion

This study aimed to establish the effects of a sociotherapy program in Rwanda on social capital and mental health, and to investigate whether these effects were correlated. We measured three elements of social capital: cognitive social capital, support, and civic participation. We hypothesized that the intervention would positively impact social capital, and that as a result mental health would increase. We found a positive but small effect of the intervention on civic participation and mental health. We could not establish a correlation between over time changes in civic participation and mental health.

Civic participation refers to an active attitude towards one's community, and to participating in collective actions within that community. The concept is easily linked to that of collective efficacy, which Sampson et al. (1997) defined as 'social cohesion among neighbors combined with their willingness to intervene on behalf of the common good'. They added that whereas social capital

### Table 1

Socio-demographic characteristics of experimental and control group at baseline.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Experimental group n = 100</th>
<th>Control group n = 100</th>
<th>Tests indep. T-tests/Chi²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>45 (45%)</td>
<td>47 (47%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Female</td>
<td>55 (55%)</td>
<td>53 (53%)</td>
<td></td>
</tr>
<tr>
<td>Mean age</td>
<td>(Min–max) 34.9 (16–76)</td>
<td>38.5 (16–73)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>15.8</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Nil 48 (48%)</td>
<td>54 (54%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Primary</td>
<td>42 (42%)</td>
<td>34 (34%)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>10 (10%)</td>
<td>12 (12%)</td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>Marginal 6 (6%)</td>
<td>13 (13%)</td>
<td>χ²(2) = 0.022</td>
</tr>
<tr>
<td>Poor</td>
<td>83 (83%)</td>
<td>66 (66%)</td>
<td></td>
</tr>
<tr>
<td>Sufficient</td>
<td>11 (11%)</td>
<td>21 (21%)</td>
<td></td>
</tr>
<tr>
<td>Mean SRQ-20</td>
<td>8.41</td>
<td>8.26</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

### Table 2

Correlations of mental health and three elements of social capital: cognitive social capital, support and civic participation in experimental and control group at T0 (baseline measurement), T1 (after intervention, 3 months), T2 (follow-up at 8 months).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mental Health T0</td>
<td>0.67***</td>
<td>0.64***</td>
<td>−0.16</td>
<td>−0.19</td>
<td>−0.06</td>
<td>−0.06</td>
<td>0.08**</td>
<td>−0.05**</td>
<td>−0.18</td>
<td>−0.35**</td>
<td>−0.14</td>
<td>8.26</td>
<td>(4.84)</td>
<td></td>
</tr>
<tr>
<td>2 Mental Health T1</td>
<td>0.61***</td>
<td>0.73***</td>
<td>−0.25*</td>
<td>−0.25*</td>
<td>−0.07</td>
<td>−0.05</td>
<td>0.13</td>
<td>−0.13</td>
<td>−0.10</td>
<td>−0.30**</td>
<td>−0.37**</td>
<td>7.37</td>
<td>(4.86)</td>
<td></td>
</tr>
<tr>
<td>3 Mental Health T2</td>
<td>0.66***</td>
<td>0.47***</td>
<td>−0.34*</td>
<td>−0.34*</td>
<td>−0.25*</td>
<td>−0.12</td>
<td>0.03</td>
<td>−0.08</td>
<td>−0.13</td>
<td>−0.40**</td>
<td>−0.38**</td>
<td>28.79</td>
<td>(3.47)</td>
<td></td>
</tr>
<tr>
<td>4 Cognitive T0</td>
<td>−0.20*</td>
<td>−0.01</td>
<td>−0.16</td>
<td>0.41***</td>
<td>0.36*</td>
<td>0.08</td>
<td>0.02</td>
<td>0.05</td>
<td>0.15</td>
<td>0.13</td>
<td>0.25*</td>
<td>13.61</td>
<td>(4.03)</td>
<td></td>
</tr>
<tr>
<td>5 Cognitive T1</td>
<td>−0.14</td>
<td>−0.06</td>
<td>0.14</td>
<td>0.36**</td>
<td>0.32*</td>
<td>0.19</td>
<td>0.29**</td>
<td>0.14</td>
<td>0.12</td>
<td>0.18</td>
<td>0.34**</td>
<td>13.09</td>
<td>(4.13)</td>
<td></td>
</tr>
<tr>
<td>6 Cognitive T2</td>
<td>0.15</td>
<td>0.03</td>
<td>0.27*</td>
<td>0.33**</td>
<td>0.24*</td>
<td>0.15</td>
<td>0.06</td>
<td>0.14</td>
<td>0.21</td>
<td>−0.04</td>
<td>0.32**</td>
<td>6.17</td>
<td>(4.52)</td>
<td></td>
</tr>
<tr>
<td>7 Support T0</td>
<td>0.16</td>
<td>0.08</td>
<td>−0.11</td>
<td>−0.04</td>
<td>0.01</td>
<td>0.01</td>
<td>0.15</td>
<td>0.09</td>
<td>0.30**</td>
<td>0.22*</td>
<td>0.00</td>
<td>3.09</td>
<td>(3.48)</td>
<td></td>
</tr>
<tr>
<td>8 Support T1</td>
<td>0.16</td>
<td>0.06</td>
<td>0.20</td>
<td>0.06</td>
<td>−0.14</td>
<td>0.17</td>
<td>0.23*</td>
<td>0.13</td>
<td>0.19</td>
<td>0.12</td>
<td>0.17</td>
<td>3.47</td>
<td>(4.03)</td>
<td></td>
</tr>
<tr>
<td>9 Support T2</td>
<td>0.13</td>
<td>0.02</td>
<td>0.21</td>
<td>0.15</td>
<td>0.16</td>
<td>−0.09</td>
<td>0.01</td>
<td>−0.01</td>
<td>−0.08</td>
<td>0.19</td>
<td>0.11</td>
<td>4.26</td>
<td>(4.29)</td>
<td></td>
</tr>
<tr>
<td>10 Civic Participation T0</td>
<td>0.07</td>
<td>0.01</td>
<td>−0.16</td>
<td>0.25*</td>
<td>0.22*</td>
<td>0.19</td>
<td>0.08</td>
<td>0.05</td>
<td>0.16</td>
<td>0.31**</td>
<td>0.37**</td>
<td>7.74</td>
<td>(2.37)</td>
<td></td>
</tr>
<tr>
<td>11 Civic Participation T1</td>
<td>0.23**</td>
<td>0.11</td>
<td>−0.24*</td>
<td>0.15</td>
<td>0.40***</td>
<td>0.19</td>
<td>0.31**</td>
<td>0.14</td>
<td>0.12</td>
<td>0.49***</td>
<td>0.30*</td>
<td>6.67</td>
<td>(2.76)</td>
<td></td>
</tr>
<tr>
<td>12 Civic Participation T2</td>
<td>0.19</td>
<td>−0.08</td>
<td>0.07</td>
<td>0.07</td>
<td>0.09</td>
<td>0.01</td>
<td>0.11</td>
<td>0.08</td>
<td>0.05</td>
<td>0.36**</td>
<td>0.47***</td>
<td>8.03</td>
<td>(2.39)</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>8.41</td>
<td>7.82</td>
<td>6.31</td>
<td>12.55</td>
<td>12.33</td>
<td>13.80</td>
<td>3.05</td>
<td>3.86</td>
<td>4.05</td>
<td>6.59</td>
<td>7.12</td>
<td>7.78</td>
<td>4.84</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>5.05</td>
<td>4.64</td>
<td>3.91</td>
<td>4.35</td>
<td>4.45</td>
<td>4.08</td>
<td>3.02</td>
<td>4.10</td>
<td>4.02</td>
<td>2.99</td>
<td>2.96</td>
<td>1.82</td>
<td>4.03</td>
<td></td>
</tr>
</tbody>
</table>

p < 0.05, **p < 0.01, ***p < 0.001.

a Sociotherapy group: below diagonal; control group: above diagonal.

b Numbers represent correlations unless otherwise indicated.

### Table 3

Model fit indices of linear growth models.

<table>
<thead>
<tr>
<th>Model</th>
<th>Civic Participation LGM</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.03</td>
<td>0.859</td>
<td>0.00</td>
<td>1.00</td>
<td>1.10</td>
<td>16.03</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.39</td>
<td>0.824</td>
<td>0.00</td>
<td>1.00</td>
<td>1.13</td>
<td>24.39</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.14</td>
<td>0.711</td>
<td>0.00</td>
<td>1.00</td>
<td>1.03</td>
<td>16.14</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.61</td>
<td>0.767</td>
<td>0.00</td>
<td>1.00</td>
<td>1.04</td>
<td>24.61</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8.14</td>
<td>0.063</td>
<td>0.07</td>
<td>0.97</td>
<td>0.93</td>
<td>52.79</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>14.51</td>
<td>0.105</td>
<td>0.06</td>
<td>0.98</td>
<td>0.94</td>
<td>66.51</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F. Verduin et al. / Social Science & Medicine 121 (2014) 1–9
embodies the resource potential of social networks, it should not be overlooked that the process of activating or converting social ties to social capital in other countries can increase control over their lives and environment, and that this increased control over post-disaster demands may in turn mitigate individual mental health problems. Wind et al. (2011, 2012) found that high social capital may foster collective efficacy and decrease the employment of coping strategies and social support by individuals, and that social capital exerts its effect on mental health outcomes via collective efficacy.

In our study a small positive effect of the intervention was found on both mental health and civic participation, a concept akin to social capital. This may indicate that community level psychosocial interventions like the sociotherapy program might be helpful in promoting post-conflict recovery in contexts like Rwanda. Such conclusion would be important but untimely, given the study’s limitations.

Spirituality may have played a role as a confounding variable, as the sociotherapy program was openly supported by the Episcopal Church of Rwanda, and several group facilitators were pastors who also used religious exercises during meetings. However, there is not much indication that the effect of the program is attributable to specific characteristics of individual group leaders. Using a Bayesian analysis, Scholte et al. (2011a) assessed the extent to which the sociotherapy effectiveness differed between groups. It appeared that only 14% of the total variability in the score change could be attributed to factors associated with specific sociotherapy groups or any background of group leaders, e.g. spirituality. Notably, group leaders also had backgrounds other than religious, varying from teachers, local leaders, or civil servants to NGO staff. The most relevant working mechanisms as identified through qualitative research were: *enabling to ‘unburden the heart’; *replacing traditionally hierarchical relationships successfully by relationships based on equality; and *providing the opportunity to reconnect with others in the group (Richters et al., 2013).

The validity of outcomes of this study may have been limited by the use of response categories in questionnaires, as these may mask nuances in definitions and understanding of complex concepts. Even though qualitative research and extensive validation of the Short A-SCAT was performed in various countries, and despite our adaptation of the instrument to the local context, responders may not have interpreted all items in their intended meaning. This study did not establish change over time for support and cognitive social capital; we only found change over time for civic participation. The intervention may have exerted an effect on civic participation only, without affecting the other elements of social capital we measured.

In their study on the promotion of social capital in Nicaragua, Brune and Bossert (2009) already pointed to indications that in non-western cultures cognitive and structural components may be disconnected. In the highly complex sociocultural setting of post-genocide Rwanda, elements of cognitive social capital like trust, sense of belonging and solidarity are not easily discussed openly. Therefore, items of our questionnaire addressing such sensitive issues may not have elicited valid responses. Especially men tend not to trust others easily and to keep problems inside. Qualitative information consistently pointed out that men in Rwanda generally do not share and seek support for emotional problems (Richters et al., 2005, 2008; Richters, 2010; Verduin et al., 2010).

In turn, lack of trust may impact mutual support. The use of credit in exchanges was common in preconflict Rwanda (Coletta et al., 2001).
This practice has diminished over time, in part due to decreased levels of trust as a consequence of war, but also because of increasing poverty and the value placed on money and individualism. In general, people have become more reluctant to give gifts, for they are less confident that these acts will be reciprocated. This should be taken into consideration when addressing the issue of support in countries as poor as Rwanda (Verduin et al., 2010). In our study, scores on items of the Short A-SCAT addressing support were not consistent, and no change over time was established. This may be due to insufficient validity of the items concerned. A systematic cognitive validation of the instrument’s version used in this study, performed in accordance with a method described by De Silva et al. (2005b), revealed that respondents did not seem to differentiate between the various kinds of support mentioned in the respective items: comforting, encouraging, or economic support (Verduin et al., 2010). In this very poor region, all support seemed to be expressed in material forms. If no goods were received or given, no comfort or encouragement was experienced or provided. De Silva et al. (2005b) describe similar misunderstandings in respondents’ interpretation of items addressing support when using the A-SCAT in Peru and Vietnam. Another limitation of this study is that analyses did not include respondents’ individual appraisal of current and past experiences of their coping behavior, both of which may mediate the association between social capital and mental health (Wind et al., 2011). In our study we could not show a correlation between the effect of the intervention on social capital and mental health, which was contrary to what might be expected. Investigation of such possible mediators might have led to a clearer understanding of the relation between both outcomes. Also, other mediating factors such as social functioning, substance abuse and domestic violence might have been considered.

Our study results may also have been weakened by missing data, although it has been shown that under ignorable missing data conditions FIML estimates are unbiased (Enders and Bandalos, 2001). Additionally, larger samples might have increased the validity of the multilevel models. And finally, time may have impacted study outcomes in various ways: Firstly, time intervals may not have been long enough to measure real change in this fragile society. Secondly, a delay may exist between social capital gains and mental health gains, which would affect the analysis of the correlation between linear changes.

It is unclear to us why in our study T0 scores on civic participation were higher in the control group than in the intervention group. Possibly, individuals with lower scores were not the ones easily run into during the convenience sampling, while intervention group respondents had been actively asked to join the groups. Also, our experimental and control group differed on socioeconomic status. We do not think that this seriously impacted the actual equivalence of both groups. Byumba’s population is extremely poor in general, and actually there is little real variety in SES. Possibly, the difference is caused by the method of SES determination. Contrary to the control group, participants of the experimental group described the state of their houses themselves. This may have resulted in a less divergent SES score distribution in the experimental group.

The intervention method may benefit if groups appoint one participant as being responsible for meetings to continue after the program has formally ended. After the intervention in Rwanda various groups actually continued meeting, sometimes even starting joint income generating activities, but not all did so. Notably, organizing communities through the appointment of so-called ‘responsibles’, has for a long time been common practice in Rwanda.

During a seven years period, over 10,000 individuals participated in the sociotherapy program studied here. Over the course of time the Episcopal Church of Rwanda became the sole co-ordinator of the intervention, albeit with ongoing external financial support. Lastly, the intervention was also implemented by local NGOs in other regions in Rwanda (http://sociotherapy.org) and in the neighboring countries Burundi and the Democratic Republic of Congo. Recently a sociotherapy program also started in Liberia.

5. Conclusion

This study addresses the potential of community based sociotherapy to promote recovery in a war-affected population. Evaluating the intervention’s delivery is complicated by the method’s openness to contextual determinants, such as the different backgrounds, living situations and wishes of group participants and leaders. Further identification of effective elements requires close monitoring of practices per group and per session. Also, application in strongly differing populations may reveal to what degree the method’s effectiveness is impacted by cultural and contextual factors like religion and history.

The study hints at the possibility to foster one element of social capital, i.e. civic participation, and to simultaneously impact mental health. However, further research is needed. The sensitivity of the Short A-SCAT as a measure of social capital in complex sociocultural settings like Rwanda needs to be confirmed. In particular, the validity of items addressing structural social capital and support needs attention (Verduin et al., 2010). Future studies also need to determine which specific elements of sociotherapy are effective, which particular elements of social capital can intentionally be promoted in different settings, and what are possible pathways of influence on mental health. Further elaboration is highly relevant as post-conflict recovery of a population is best served by an increase of both societal cohesion and mental health. It may lead the way to community based psychosocial interventions that effectively promote wellbeing in war-affected populations.

Acknowledgments

This study was partly supported by a grant to Femke Verduin from the Health Research Development Counsel, Department Prevention Program (ZonMW), OOG-Geestkracht (ZonMW: 60-60105-98-117).

We also thank Cordaid for funding the research and Prins Bernhard Cultuurfonds for their grant to F. Verduin. We thank Rutayisire Theoneste, Ngendahayo Emmanual, Sarabwe Emmanuel and Hategekimana Balthazar for helping us organise and conduct the research. We also thank our loyal interviewers: Rukundo Ange, Mugisha-Bitanuzire John-Peter, Umuhzo Adelin, Uwizeye Beata, Ingabire Bernadette, Uwizeymana Alberthose, Mukanyiligira Marie Grace, and Muhongwanseko Scholastique.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2014.09.054.

References


