

Resilience and well-being in the Caribbean: findings from a randomized controlled trial of a culturally adapted multi-component positive psychology intervention

Tom Hendriks¹

Marijke Schotanus-Dijkstra²

Aabidien Hassankhan¹

Wantley Sardjo¹

Tobi Graafsma³

Ernst Bohlmeijer²

Joop de Jong⁴

1. Anton de Kom University of Suriname, Department of Psychology, Suriname
2. University of Twente, Centre for eHealth and Wellbeing Research (CEWR), Department of Psychology, Health and Technology, Enschede, The Netherlands
3. Institute of Graduate Studies and Studies (IGSR), Anton de Kom University of Suriname, Suriname
4. Amsterdam Institute for Social Science Research (AISSR), University of Amsterdam, the Netherlands

Correspondence concerning this article should be addressed to Tom Hendriks, Department of Psychology, Anton de Kom Universiteit van Suriname, Leysweg 86, P.O.B. 9212, Paramaribo, Suriname. E-mail: tom.hendriks@uvs.edu

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

Abstract

The objective of this study is to evaluate the effects of a culturally adapted multi-component positive psychology intervention (MPPI) on resilience. We conducted a randomized controlled trial among 158 employees of multi-ethnic origin in Paramaribo, Suriname. The participants were assigned to a 6-session intervention program or a wait-list control group. Data were collected at baseline, post-intervention, and at 3-months follow-up. Strict guidelines were followed to minimize risk of bias and to assure a high methodological quality. Analysis of covariance revealed large significant improvements on resilience, mental well-being, and negative affect, moderate improvements on depression and positive affect, and small improvements on anxiety compared to control. The intervention was not more beneficial on stress, financial distress, and psychological flexibility than control. In conclusion, a culturally adapted MPPI may be a promising intervention to increase resilience and well-being among healthy adults with a multi-ethnic background in the Caribbean.

Keywords: resilience, well-being, cultural adaptation, randomized controlled trial, cross-cultural, Caribbean

Resilience and well-being in the Caribbean: findings from a randomized controlled trial of a culturally adapted multi-component positive psychology intervention

Background

The general lack of studies from non-Western countries is a concern that has been voiced by many scholars in the field of cross-cultural psychology (Berry, 2013; Henrich, Heine, & Norenzayan, 2010; Jahoda, 2016; Marsella & Yamada, 2010; Owusu-Bempah & Howitt, 2000). However, it appears that the increase in the number of studies within the growing field of positive psychology is not only limited to publications originating from Western countries; a quarter to a third of the studies in the field of positive psychology now originate from non-Western countries (Donaldson, Dollwet, & Rao, 2015; Hendriks et al., 2018b; Kim, Doiron, Warren, & Donaldson, 2018). A recent systematic review and meta-analysis on the efficacy of positive psychology intervention (PPIs) from non-Western countries that included 28 randomized controlled trials (RCTs) reported that effect sizes of studies from such countries were considerably higher than those from Western countries (Hendriks et al., 2018a). A possible explanation for the higher effect sizes in studies from non-Western countries was the low quality of the studies, which may have contributed to methodological biases. For example, studies from non-Western countries often did not adequately describe the process of randomization, or concealment of allocation. Moreover, 25 of the 28 included studies were underpowered, which could have led to inflated estimates of the effect sizes (La Caze & Duffull, 2011). In addition, intention-to-treat analysis was only conducted in five studies, which could have resulted in an overestimation of the effects of an intervention (Gupta, 2011; Hollis & Campbell, 1999). The meta-analytic study also explored the possibility that PPIs are more effective in non-Western countries because they form a good fit with the cultures of such countries. Namely, many PPIs include activities that aim to increase well-being through exercises that improve social relationships, for example ‘random acts of kindness’ (Buchanan & Bardi, 2010) and ‘gratitude visit’ (Emmons & Stern, 2013). Most non-Western countries are collectivistic societies that emphasize the needs and interests of the group, rather than the individual (Darwish & Huber, 2003) and therefore PPIs may elicit greater enthusiasm among participants in non-Western countries than in Western countries. Also, a third of the included interventions were culturally adapted and evidence suggests that culturally-adapted interventions may be more effective than interventions that lack cultural sensitivity (La Roche & Lustig, 2010; Smith, Domenech-Rodriguez, & Bernal, G., 2010). Cultural

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

adaptation could be described as the systematic modification of evidence-based treatments or intervention protocols with the aim to increase their compatibility with the cultural patterns, meanings, and values of the target population of the intervention (Bernal & Domenech-Rodriguez, 2012). Cultural adaptations potentially allow an intervention to address specific cultural protective and risk factors that are unique within specific cultural contexts (Martinez Jr, 2006). Studies also suggest that cultural sensitivity may lead to increased engagement (Lau, 2006), commitment (Castro, Barrera, & Martinez, 2004), and reduce drop-out (Hwang, 2006). In contrast, interventions that are culturally insensitive may not only be less effective, but may even be harmful (Christopher, Wendt, Marecek, & Goodman, 2014). For example, in Western therapeutic sessions, disclosure of private information about family matters is encouraged, whereas in collectivistic cultures this can lead to family conflicts and increase anxiety among participants (Ganesan, 2006).

Although a third of the studies in the aforementioned meta-analysis were culturally adapted, only three studies provided detailed information on the process of cultural adaptation. Zhang, Fu, and Wan (2014) conducted a forgiveness intervention among 31 college students of Chinese origin who experienced romantic relationship issues. In their study they presented a model for forgiveness interventions in collectivistic cultures that was developed by Tao and Fu (2010). This model originally emphasized the importance of interpersonal harmony and the training of skills to reestablish harmonious relationships and to use traditional culture to encourage people to forgive others and to experience the benefits of improved interpersonal relationships. The intervention contained a homework assignment to collect Chinese proverbs and traditional stories about forgiveness which were shared with the other participants at the beginning of the following session. Differences in forgiveness strategies between Chinese and Western cultures were also discussed by the group leader. The intervention further contained meditation exercises. A study by Ji and colleagues (2016) described the effects of a 10-week culturally adapted forgiveness intervention among 36 college student in Hong Kong and included similar cultural adaptations. Another example of a culturally adapted intervention was described by Choy & Lou (2016) who conducted an intervention based on positive reminiscence among 114 community-dwelling Chinese adults. The study described how they first conducted a critical literature review about reminiscence interventions and cognitive-behavioral therapy for depression. The original intervention protocol was then translated and modified on the basis of advice of several local experts who had conducted reminiscence and CBT therapy within the Chinese population. Cultural

adaptations included pre-intervention individual interviews with the participants, development of homework assignments that fitted the cultural background of the participants, and visiting absent participants at home in order to gain insight into the reasons for their absence.

The meta-analytic study on the efficacy of RCTs from non-Western countries (Hendriks et al., 2018a) contained 16 single component studies and 12 studies that contained multi-components. Single component intervention studies usually consist of one positive psychology activity or focus on a single domain, for example studies on the effects of gratitude interventions or forgiveness therapy. Multi-component positive psychology interventions (MPPIs) are interventions that contain a variety of evidence-based individual exercises and that target two or more theoretically relevant hedonic and eudaimonic well-being components, conducted within an integral program (Hendriks et al., 2019). Several models and theories have recently been introduced that attempt to explain how PPIs can contribute to increased well-being. One such model is the Synergetic Change model (Rusk, Vella-Brodrick, & Waters, 2017), which covers five major domains of psycho-social functioning, namely, (1) attention and awareness, (2) comprehension and coping, (3) emotions, (4) goals and habits, and (5) relationships and virtues. The model suggests that there is a synergetic interaction between the various domains, which in turn can lead to spill-over effects and synergy. This implies that interventions that contain multiple components that are targeted at multiple domains of psychosocial functions could have larger effects than interventions that are targeted at a single domain.

Resilience and Mental Well-being

Resilience can be described as the capacity to deal effectively with stress and adversity, to adapt successfully to setbacks (Luthar, Cicchetti, & Becker, 2000; Zautra, Hall, & Murray, 2008), and to bounce back after negative emotional experiences (Tugade & Fredrickson, 2004). Resilience refers to positive outcomes in spite of threats to adaptation or development (Masten, 2001) and factors and mechanisms that play a role in dealing functionally with, and contribute to successful adaptation to problems (Friborg, Hjemdal, Martinussen, & Rosenvinge, 2009). Resilience is an active process and can be conceptualized as multi-dimensional, having three overarching characteristics: (1) individual, positive, and dispositional attributions; (2) family cohesion and support; (3) availability of external support systems (Garmezy, 1993; Rutter, 1987; Werner, 1993). Various factors influence resilience at

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

individual as well as collective levels, where socio-economic, cultural, and historical factors also can be of influence (Gunderson, 2010; Hobfoll & de Jong, 2013). Such an approach is referred to as ecological resilience, which is a process whereby desirable outcomes are attained despite significant risks to the adaptation and development of individuals. This process is thought to involve a dynamic relationships between risk, protective, and promotive factors at different levels of the social ecology (e.g., individual, family, school, neighborhood levels) (Ungar, Ghazinour, Richter 2013; Betancourt Meyers-Ohki, Charrow, & Tol 2013). In contrast, the study of psychological resilience is focused on the psychological characteristics of individuals within the context of the stress process (Fletcher & Sarkar, 2012).

According to the network approach (Cramer, Waldorp, Maas, & Borsboom, 2010), mental disorders are caused by interactions between biological and psychological symptoms. According to Borsboom (2017), mental health depends on the interaction between the connectivity of the symptoms in the network and the connectivity between external stressors (e.g. adverse life events). The connections can be either strong or weak. When network connectivity and stressors connectivity are weak, there is mental health with high levels of resilience. When both network connectivity and stressors are strong, mental disorders arise. The model also suggests that strong network connectivity and weak stressor connectivity will result in elevated vulnerability, and weak network connectivity and strong stressor connectivity will result in elevated symptomatology. Two models that also emphasize the multi-dimensionality of mental health are the Dual-Factor Model of Mental Health (Antamarian, Scott Huebner, Hills, & Valois, 2010; Greenspoon & Saklofske, 2001) and the Two Continua Model (Keyes, 2007; Westerhof & Keyes, 2010). Both models were developed within the theoretical framework of positive psychology and suggest that individuals with symptoms of pathology can experience low as well as high levels of well-being, and the same applies to individuals with no symptoms of pathology.

Mental well-being and resilience are two related constructs (Harms, Brady, Wood, & Silard, 2018). Researchers in the field of resilience and well-being have in common that both focus on the benefits of salutogenic constructs (Luthar, Lyman, & Crossman, 2014) and resource factors for the development of mental health (Miller-Lewis, Searle, Sawyer, Baghurst, & Hedley, 2013). Studies identified resilience as a set of personal characteristics that include hardiness, self-efficacy, self-esteem, optimism, faith, and humor (Grafton, Gillespie, & Henderson, 2010). A meta-analytic study that included 60 studies showed that

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

(trait) resilience is positively correlated to positive indicators of mental health (Hu, Zhang, & Wang, 2015) and numerous studies have shown that resiliency programs can increase mental well-being (Arnetz, Nevedal, Lumley, Backman, & Lublin, 2009; Burton, Pakenham, & Brown, 2010; McCraty & Atkinson, 2012; Joyce et al., 2018). It should be noted that most of these resiliency programs are based on cognitive behavioral principles. For example, the Penn Resiliency program is focused on the development of cognitive and emotional skills to deal with adversity, using cognitive behavioral therapy-based exercises (Gillham, Brunwasser, & Freres, 2008). The relation between resilience and well-being is bidirectional: resilience can predict well-being (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Jackson, Firtko, & Edenborough, 2007) and well-being can predict high levels of resilience (Kuntz, Näswall, & Malinen, 2016). Studies also suggest that resilience can function as a moderator between stressors and well-being (Ifeagwazi, Chukwuorji, & Zacchaeus, 2015; Sexton, Hamilton, McGinnis, Rosenblum, & Muzik, 2015).

Present Study

The present study was conducted in Paramaribo, the capital city of Suriname. Suriname is a former colony of the Netherlands, located north of Brazil and considered as a part of the Caribbean (Best, 1967). It is a member of the Caribbean Community (CARICOM), an organization of fifteen Caribbean nations and dependencies aimed at promoting social and economic development between its members. Suriname is considered to be an upper middle-income country (The World Bank, 2016). However, after more than a decade of economic growth (Ooft, 2016), Suriname recently was confronted with an economic crisis. During the period September 2015 to December 2017, the inflation rate reached almost 80% and the national currency of Suriname devaluated by more than 100% (TradingEconomics, 2018). With 70% of all households already living below the poverty line before the economic downturn (van der Kooij et al., 2015), the crisis may have had a considerable negative impact on the mental well-being of the Surinamese people and put their resilience to the test. Psychological intervention programs to counteract the effects of adversity are not widely available. We therefore took an existing training program and adapted it to the Surinamese culture, which resulted in the Strong Minds Suriname program. The study was conducted during the height of the economic recession in Suriname. The aim of the present study was to examine the efficacy of this program, which was specifically designed to increase resilience. We hypothesized that the Strong Minds Suriname program would significantly increase

resilience and well-being among workers in Suriname compared to wait-list control. Findings from a previously conducted meta-analysis suggests that MPPI have small to moderate effects on well-being (Hendriks, 2018), therefore we expected to find at least moderate effect sizes at post-test for the intervention condition on resilience and mental well-being.

Assessments took place at baseline, after the 6-week program (post-test) and at 3-months follow-up.

Method

Study design

The study was a parallel single-blinded RCT, with an active intervention group and a wait-list control group and an allocation ratio of 1:1. The trial was designed according to the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) guidelines (Chan et al., 2013) and the results are reported according to the Consolidated Standards of Reporting Trials (CONSORT) (Moher et al., 2010).

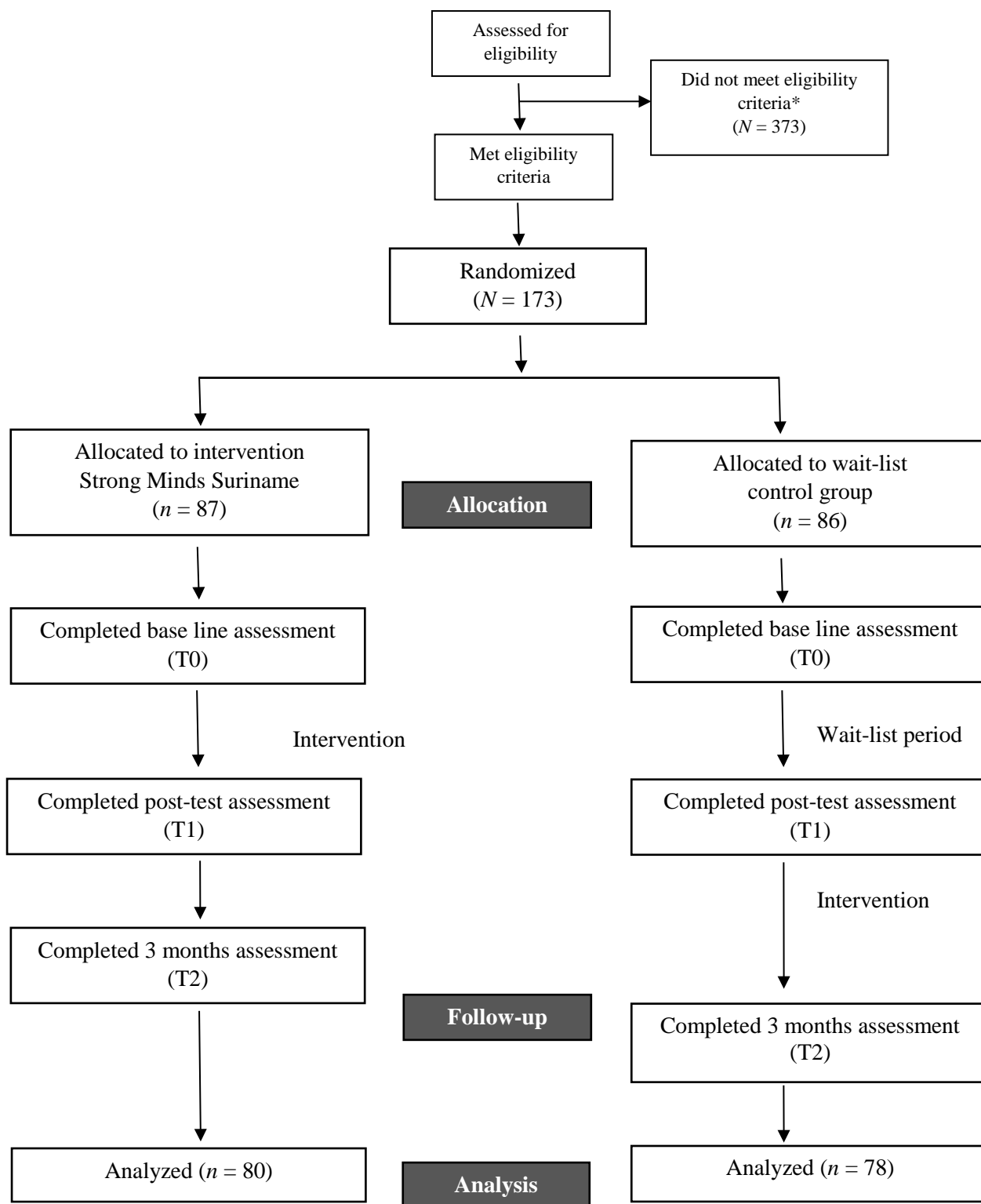
Procedure

We recruited employees from three companies in Paramaribo. Potential participants were screened by the respective human resource managers of these companies and they were included on the basis of the following criteria: (1) age between 18 and 60 years; (2) sufficiently fluent in the Dutch language to capably fill-out questionnaires, read a training manual, and participate in written exercises; (3) available to participate in an opening session, followed by six 2-3 hour intervention sessions, for six consecutive weeks. Participation was voluntary and occurred on an opt-out basis. In total, 173 employees met the inclusion criteria. Initially, we randomized 173 participants to the intervention or control group. Two days before the start of the training, one company cancelled the participation of fifteen of their employees due to unexpected scheduling changes, equally distributed across the intervention and control group. The final sample consisted of 158 employees who completed the baseline assessment (T0). We defined drop-outs as participants who completed the baseline assessment but who did not complete post-test and/or follow-up assessments. Participants were randomly assigned to either the intervention group ($n = 87$) or the wait-list control group ($n = 86$), using the online program research randomizer (<https://www.randomizer.org>). All randomized participants received an information letter and an invitation to attend an opening session. During this session, self-report questionnaires were administered, after

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

which all participants received psycho-education on resilience. At the end of the session they received a sealed opaque envelope containing their given group number, which corresponded to one of the conditions. This procedure was performed by a different independent party to maximize allocation concealment. One week after the opening session, on April 5, 2017, a total of 80 participants started with the intervention. After post-test assessment, the 78 participants of the wait-list group also received the intervention. In total, 144 participants completed post-test and 120 participants completed the 3-months follow-up assessment. Figure 1 depicts participant flow from randomization to retention over the three measurement occasions. The investigators in the trial were blinded. The human resource managers of the participating companies created a personal code for each participant. The investigators who allocated the participants and who entered and analyzed the data could identify participants only by this code and not by their names. Several strategies were implemented to ensure fidelity (Horner, Rew, & Torres, 2006). For example, a training manual was developed to standardize the training by the coaches, this in addition to a manual for the participants. The project leader observed the interaction between the coaches and the participants during each session and debriefed them afterwards. Due to financial reasons and time restrictions, only a basic fidelity check was conducted.

Figure 1. Flow chart of the participants



* Despite instructions provided to the HR representatives of the participating companies who were responsible for assessment eligibility, the reasons for exclusion were not registered and therefore cannot be reported. On further inspection, the HR representatives indicated that the main reason for exclusion was unavailability of employees, since the program was conducted during working hours.

Cultural adaptation of the Strong Minds Suriname program

The Strong Minds Suriname program consisted of six intervention sessions. An overview of the content of all sessions is presented in Appendix 1. The intervention was based on the Shell Resilience Program. This program was developed by the health department of the multi-national company Royal Dutch Shell, and implemented among thousands of its employees in 53 countries, during the period 2011 to 2014 (De Valk, 2013). The program originally consisted of twelve modules, which were based on ten guidelines for developing resilience according to the American Psychological Association (American Psychological Association, 2017). The effectiveness of the program was examined in a retrospective cohort study, where it was reported that the program contributed to a significant increase in resilience (Hilderling van Lith, 2015). We adapted the Shell Resilience Program using a three-phased process, following guidelines for cultural adaptation as described by Domenech-Rodriguez and Wieling (2004) and guidelines for the implementation of culturally sensitive cognitive behavioral therapies (Hinton & Jalal, 2014). Cultural adaptation is an iterative process in which a distinction can be made between surface structure level and deep structure level adaptations. Surface structure adaptations pertain to the matching of the observable intervention materials and messages with the target populations. Deep structure adaptations reflect the incorporation of cultural, social, environmental, and historical factors into the intervention (Resnicow, Soler, Braithwaite, Ahluwalia, & Butler, 2000).

The first phase of cultural adaptation in this study focused on needs assessment and included a literature study on well-being in the Caribbean, a qualitative study to uncover which strengths were associated with resilience in Suriname, and needs assessment of the various stakeholders involved. The second phase involved the selection, evaluation, and adaptation of the intervention program and the instruments. Our needs assessment, for example, showed that it was not feasible to conduct the original program of twelve modules for financial reasons and limited availability of the participants. Therefore, the number of sessions was reduced to six. Some modules were also considered less relevant to the target population (e.g. the module 'accept that change is a part of living' was rejected because acceptance was considered a strength that was already well-developed among most Surinamese). Instruments to measure the various outcomes were selected and revised by a

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

group of local psychologists. The program was adapted with consultation of Dutch experts in the field of positive psychology. On closer inspection, we found that many of original activities in the program were derived from the framework of neuro-linguistic programming (NLP) (Bandler, Grinder, & Andreas, 1982). NLP is, however, often viewed as pseudo-scientific because there is insufficient empirical evidence supporting the claim that it improves mental health (Murray, 2013; Sturt et al., 2012; Witkowski, 2010). For this reason, we replaced the NLP-based exercises in the program with evidence-based positive psychology activities (Seligman, Steen, Park, & Peterson, 2005; Sin & Lyubomirsky, 2009). Surface structure level adaptations included adapting the content, semantic, conceptual, and technical equivalence of the program material. This included renaming the modules were formulated in such a manner that they would appeal to the target group. For example, the module on gratitude was called “Gran Tangi”, which literally means “great thanks” in Sranangtongo, and is a common Surinamese expression that is used when one is grateful for something. Deep structure level adaptations were also made, for example training a group of nine employees from the participating countries as coaches, who would assist the employees with the performance of the activities. These coaches had various ethnic backgrounds, thereby representing the ethnic composition of the participants in the study. In this way, we aimed to promote harmony and equality among the participants with different ethnic backgrounds. A qualitative study that was conducted prior to the intervention found that religiousness was a main source for resilience in Suriname (Hendriks, Graafsma, Hassankhan, Bohlmeijer, & de Jong, 2018). Therefore, we developed a module that focused on forgiveness, an important theme in Christianity, Islam, and Hinduism (Hunter, 2007), an exercise on how to surrender psychological problems to a higher power, and an exercise on how to integrate expressions of gratitude into daily prayer. Finally, during the third stage of the adaptation process, we tested the program on a group of nine employees from the three participating companies. The findings of this pilot study resulted in some final adaptations, for example in linguistic alterations in the training manual. An overview of all adaptations is shown in Appendix 2.

Measures

Resilience. The primary outcome was resilience which was assessed with the Dutch Resilience Scale (RS-nl) (Portzky, Wagnild, De Bacquer, & Audenaert, 2010), the Dutch

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

adaptation of the Wagnild and Young Resilience Scale (Wagnild & Young, 1993). The RS-nl has twenty-five items and uses a four-point Likert scale with two anchoring statements ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Higher total mean scores indicate a higher level of resilience. Cronbach's alpha in the present study was .90 at pre-test, .92 at post-test, and .93 at follow-up.

Mental well-being. Mental well-being was measured by the Mental Health Continuum-Short Form (MHC-SF), a 14-item questionnaire that measures emotional well-being, social well-being, and psychological well-being (Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). Participants were asked to indicate their level of well-being over the past four weeks. Each item was rated on a scale from 0 (never) to 5 (every day), with a higher score indicating a higher level of well-being. Cronbach's alpha in the present study was .89 at pretest, .92 at post-test, and .94 at follow-up.

Depression, anxiety, stress. Depression, anxiety, and stress were measured using the Dutch version of the Depression Anxiety Stress Scale (DASS-21), a 21-item questionnaire that measures depression, anxiety, and stress (de Beurs, van Zweden, & Hamming, 2010). Item scores ranged from 0 (did not apply to me at all – never) to 3 (*applied to me very much, or most of the time – almost always*), higher total mean scores indicating a higher level of depression, anxiety, or stress. Cronbach's alpha for depression in the present study was .75 at pre-test, .77 at post-test, and .85 at follow-up. For anxiety, Cronbach's alpha was .69 at pre-test, .78 at post-test, and .85 at follow-up. Cronbach's alpha for stress was .77 at pre-test, .78 at post-test, and .83 at follow-up.

Psychological flexibility. Psychological flexibility was measured with the Psychological Flexibility Questionnaire (PFQ). The PFQ originally was a 20-item questionnaire that measures five factors related to psychological flexibility (Ben-Itzhak, Bluvstein, & Maor, 2014). However, we selected 13 questions of the first three factors, which are: positive perception of change, characterization of the self as flexible, and self-characterization as open and innovative. During a focus group meeting with psychologists and HR representatives who rated the questionnaires, it was decided not to include the seven questions pertaining to the last two factors because these questions on reality perception were considered too abstract for the target population (i.e. some employees with a low or intermediate educational level). Items were rated on a six-point Likert-type scale ranging from 1 (*not at all*) to 6 (*very*).

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

Cronbach's alpha in the present study was .87 at pre-test, .92 at post-test, and .95 at follow-up.

Financial distress. Financial distress was measured with the InCharge Financial Distress/Financial Well-Being Scale (IFDFW), an eight-item scale that measures levels of financial distress or financial well-being (Prawitz et al., 2006). Items on the IFDFW are rated on a 10-point scale ranging from 0 (*overwhelming stress*) to 10 (*no stress at all*), with a higher score indicating a lower level of financial distress. Cronbach's alpha in the present study was .81 at pre-test, .86 at post-test, and .95 at follow-up.

Positive and Negative Affect. Positive and negative affect were measured with the Positive and Negative Affect Schedule (PANAS), a 20-item scale that measures two opposites of mood (Watson, Clark, & Tellegen, 1988). Items on the PANAS are rated on a five-point scale from 1 (*little, or not very much*) to 5 (*very much*). We used the Dutch version of the scale (Engelen, De Peuter, Victoir, Van Diest, & Van den Bergh, 2006). Cronbach's alpha for positive affect in the present study was .86 at pre-test, .86 at post-test, and .90 at follow-up assessments. Cronbach's alpha for negative affect was .84 at pre-test, .86 at post-test, and .88 at follow-up.

Client satisfaction. Client satisfaction was measured at post-test with the Client Satisfaction Questionnaire (CSQ-8). The CSQ-8 is an eight item questionnaire that is designed to measure client satisfaction with services (Larsen, Attkisson, Hargreaves, & Nguyen, 1979). Items on the CSQ are rated on a four-point Likert Scale. Cronbach's alpha in the present study was .86 at post-test.

Drop-out rates and adherence

We measured drop-out rates, defining drop-outs as participants who completed the baseline assessment but who did not complete post-test and/or follow up assessments. Based on attendance lists that were filled out by the coaches during the trial period, we calculated the adherence rate during the intervention. We defined attendance rate as high when participants attended five or six sessions, as moderate when three or four sessions were attended, and as low when zero, one or two sessions were attended.

Sample size

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

The required sample size was calculated a priori, in accordance with preliminary results of a meta-analysis of the effects of MPPIs (Hendriks, 2018) with an expected effect size of Cohen's $d = 0.51$ for resilience. Based on a two-sided significance level of 5% and an independent t-test with a statistical power of 80%, a total of 128 participants were needed. Accounting for a loss of power resulting from a drop-out rate of no more than 17.5%, it was planned to include a minimum of 150 participants, distributed equally over both conditions.

Statistical analyses

Of the 173 randomized participants, 15 did not attend the baseline assessment due to work-related scheduling conflicts. These absences were unrelated to the randomization itself and were the result of workflow processes, not individual volition. Due to these initial drop-outs, a modified intention-to-treat (mITT) analysis (Gupta, 2011; Heritier, Gebiski, & Keech, 2003) was used; only missing data from the participants that took part in the baseline assessment ($n = 158$) was imputed. All cases of item or unit level missing data from the included participants were imputed using the Expectation-Maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977). The SMS program's efficacy was analyzed using analysis of covariance (ANCOVA). For randomized pretest–posttest designs, ANCOVAs are preferable over other analytic methods (Huitema, 2011; Rausch, Maxwell, & Kelley, 2003). For all ANCOVA reported in this article, a selected measure's post-test scores were used as the dependent variable and its baseline scores were covaried. 95% confidence intervals around the mean difference ($M^{\text{Diff.}}$) were computed using bias-corrected and accelerated (BCa) bootstrapping (1,000 samples). Cohen's d_s (Lakens, 2013) effect sizes were calculated using the relevant t -statistic. Despite the F -test being an omnibus test, it is equivalent to the t -test ($t^2 = F$), a focused test, if the grouping variable only possesses two conditions, which is the case for all the reported ANCOVAs (the intervention group is compared to the wait-list group). The following formula, reported by Nakagawa and Cuthill (2007), was used to convert t values to d_s values:

$$d_s = \frac{t(n_1 + n_2)}{\sqrt{(n_1 n_2)} \sqrt{df'}}$$

The interpretation of this statistic remains unchanged. 95% confidence intervals around Cohen's d_s were also computed using the above formula and the corresponding t -values derived from the lower and upper bound of the 95% confidence intervals of the mean

difference. We examined whether the effects in the intervention condition were maintained at follow-up by conducting paired-sample *t*-tests, comparing the scores on the follow-up with those at baseline and those at post-test respectively. Imputation and all data analyses were conducted with IBM® SPSS® Statistics (version 23), two-tailed tests and $p < .05$.

Results

Participant characteristics

The mean age of the participants was 36.3 years (SD= 9.6). Just over half of the participants were female (60%). The majority of participants had a lower (36%) or middle level of educational attainment (45%). The largest ethnic group was Javanese (41%), followed by the Hindustani ethnicity (26%), and the Afro-Surinamese group (15%). Participants of mixed origins accounted for 17% of the population. The most frequently noted religious backgrounds were Christianity (40%), Islam (26%) and Hinduism (18%). All participant characteristics and baseline data are displayed in Table 1. No significant differences of socio-demographics between groups were found, except for gender and ethnicity, with an overrepresentation of male participants from Javanese descent in the intervention group. This can be attributed to the inclusion of a construction company that provided 35% of the participants. This company can be characterized as a company with a family culture, whose founder and CEO is of Javanese descent.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

Table 1. Baseline characteristics of participants in the intervention group, control group and the total sample

Group	SMS (n = 80)		WL (n = 78)		Total (N = 158)		Group	SMS (n = 80)		WL (n = 78)		Total (N = 158)	
Gender	n	(%)	n	(%)	N	(%)	Age						
Male	38	(47.5)	25	(32.1)	63	(39.9)	M	36.32		36.11		36.53	
Female	42	(52.5)	53	(67.9)	95	(60.1)	(SD)	(9.64)		(9.43)		(9.91)	
Religion	n	(%)	n	(%)	N	(%)	Age Bracket	n	(%)	n	(%)	N	(%)
Christianity	28	(35)	35	(44.9)	63	(39.9)	18-24	7	(8.8)	5	(6.4)	12	(7.6)
Hinduism	14	(17.5)	14	(17.9)	28	(17.7)	25-31	23	(28.8)	25	(32.1)	48	(30.4)
Islam	19	(23.8)	22	(28.2)	41	(25.9)	32-38	21	(26.3)	20	(25.6)	41	(25.8)
Javanism	3	(3.8)	0	(0)	3	(1.9)	39-45	14	(17.5)	13	(16.7)	27	(16.9)
No religion	3	(3.8)	1	(1.3)	4	(2.5)	46-52	9	(11.3)	7	(9)	16	(9.9)
Unknown	13	(16.3)	6	(7.7)	19	(12)	53-60	6	(7.5)	8	(10.3)	14	(8.6)
Income (SR\$)	n	(%)	n	(%)	N	(%)	Ethnicity	n	(%)	n	(%)	N	(%)
<1000	18	(22.5)	13	(16.7)	31	(19.6)	Afro-Sur.	6	(7.5)	18	(23.1)	24	(15.2)
1000-2000	36	(45)	35	(44.9)	71	(44.9)	Amerindian	0	(0)	1	(1.3)	1	(0.6)
2000-3000	11	(13.8)	13	(16.7)	24	(15.2)	Javanese	38	(47.5)	27	(34.6)	65	(41.1)
3000-4000	9	(11.3)	10	(12.8)	19	(12)	Hindustani	19	(23.8)	22	(28.2)	41	(25.9)
>4000	6	(7.5)	7	(9)	13	(8.2)	Mixed	17	(21.3)	10	(12.8)	27	(17.1)
Education	n	(%)	n	(%)	N	(%)	Children	n	(%)	n	(%)	N	(%)
Lower	58	(36.7)	30	(37.5)	28	(35.9)	0	33	(41.3)	25	(32.1)	58	(36.7)
Middle	69	(43.7)	34	(42.5)	35	(44.9)	1	19	(23.8)	23	(29.5)	42	(26.6)
Higher	22	(13.9)	10	(12.5)	12	(15.4)	2	19	(23.8)	22	(28.2)	41	(25.9)
Indeterminate	9	(5.7)	6	(7.5)	3	(3.8)	≥3	9	(11.3)	8	(10.3)	17	(10.8)
							Civil status	n	(%)	n	(%)	N	(%)
							Single	34	(42.5)	35	(44.9)	69	(43.7)
							Married	39	(48.8)	30	(38.5)	69	(43.7)
							Cohabitation	5	(6.3)	10	(12.8)	15	(9.5)
							Widowed	1	(1.3)	1	(1.3)	2	(1.3)
							Divorced	1	(1.3)	2	(2.6)	3	(1.9)

Drop-outs

In total, 158 participants completed the baseline assessment and started the intervention, 144 (91%) participants completed the post-test at seven weeks, and 120 (76%) the three month follow-up assessment. Between the pre-test and post-test, there were 14 drop-outs (9%), split evenly between both groups. Between post-test and follow-up assessment 24 participants dropped out (14%). Although there were more drop-outs in the wait-list group, this difference was not significant. At the post-test assessment (T1), we found a significant difference in age between drop-outs and completers ($M = 46.1$ vs. 35.4 , $F(1-156) = 1.15$, $p < 0.001$). In addition, the average education level and income of drop-outs was significantly lower, indicating that employees with a low educational level and low income were more likely to drop-out. At follow-up, there were no significant differences between drop-outs and

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

completers on any measured socio-demographics. Further analysis showed that drop-outs had a significantly higher score on resilience and a lower score on depression at pre-test than completers, indicating that people with a higher level of resilience or a lower level of depression were more inclined to drop-out.

ANCOVA results

Table 2 shows the unadjusted means and standard deviations of the baseline (T0), post-test (T1), and follow-up (T2) of all primary and secondary measures. Assumptions for performing analysis of (co)variance were broadly met for the primary and secondary measures.

Primary outcome: resilience

The Strong Minds Suriname program led to significantly higher levels of resilience at post-test compared to control, when baseline scores were taken into account. We found a large effect size at post-treatment ($d = 0.76$, 95% CI = 0.44-1.08).

Secondary outcomes

The ANCOVA analysis after the intervention also revealed a significant increases in mental wellbeing, as measured by the MHS-SF. Overall, we found a large effect ($d = 0.62$, 95% CI = 0.30-0.94). Concerning the subscales of the MHS-SF, the effect sizes were as follows: moderate for emotional well-being ($d = 0.38$, 95% CI = 0.06-0.69) and large for social well-being ($d = 0.59$, 95% CI = 0.27-0.91) and psychological well-being ($d = 0.55$, 95% CI = 0.23-0.87). Compared to the wait-list control group, the participants in the intervention group reported significantly lower levels of depression and anxiety. The effect size on depression was moderate ($d = 0.50$, 95% CI = 0.19-0.82), and for anxiety the effect size was small ($d = 0.32$, 95% CI = 0.01-0.64). Furthermore, we found that the intervention significantly increased positive affect and decreased negative affect. The effect size was moderate for positive affect ($d = 0.38$, 95% CI = 0.07-0.70) and large for negative affect ($d = 0.69$, 95% CI = 0.38-1.01). Finally, the results showed that there were no significant differences for stress, financial well-being, and psychological flexibility. Results of the ANCOVA are displayed in Table 3.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

Table 2. Means and standard deviations of primary and secondary outcomes

Outcomes	SMS		Wait-list	
	M	SD	M	SD
Resilience – baseline	3.07	0.40	3.13	0.30
Resilience – post-test	3.22	0.32	3.05	0.34
Resilience – follow-up	3.19	0.33	3.08	0.32
Mental well-being (total) - baseline	3.23	1.13	3.57	0.82
Mental well-being (total) -post-test	3.78	0.96	3.49	0.94
Mental well-being (total) -follow-up	3.68	0.93	3.56	0.84
Emotional well-being - baseline	3.49	1.36	3.81	0.96
Emotional well-being -post-test	3.96	1.11	3.80	0.99
Emotional well-being - follow-up	3.92	0.95	3.76	0.91
Social well-being - baseline	2.71	1.39	3.06	1.17
Social well-being -post-test	3.39	1.19	2.94	1.20
Social well-being - follow-up	3.27	0.95	3.18	1.04
Psychological well-being - baseline	3.52	1.17	3.87	0.88
Psychological well-being -post-test	4.00	0.92	3.81	0.96
Psychological well-being	3.90	0.98	3.76	0.91
Depression - baseline	1.78	0.51	1.71	0.39
Depression -post-test	1.50	0.33	1.64	0.41
Depression -follow-up	1.52	0.40	1.63	0.35
Anxiety - baseline	1.64	0.41	1.69	0.42
Anxiety -post-test	1.49	0.37	1.63	0.46
Anxiety - follow-up	1.44	0.41	1.50	0.35
Stress - baseline	1.84	0.45	1.91	0.44
Stress -post-test	1.69	0.42	1.83	0.43
Stress - follow-up	1.62	0.38	1.73	0.34
Financial distress - baseline	6.56	1.62	6.36	1.79
Financial distress -post-test	6.00	1.72	6.26	1.69
Financial distress- follow-up	5.86	1.68	6.38	1.61
Psychological flexibility - baseline	3.92	0.47	4.03	0.47
Psychological flexibility -post-test	3.94	0.54	3.92	0.47
Psychological flexibility- follow-up	3.98	0.52	3.90	0.53
Positive affect – baseline	3.69	0.56	3.82	0.57
Positive affect -post-test	3.82	0.53	3.74	0.54
Positive affect- follow-up	3.97	0.58	3.80	0.46
Negative affect- baseline	2.12	0.58	2.04	0.50
Negative affect -post-test	2.04	0.57	2.32	0.59
Negative affect - follow-up	1.99	0.61	2.29	0.51

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

Table 3. Results of analysis of covariance for intervention effects and Cohen's *d*, modified intention-to-treat analysis

Measures	<i>F</i> (<i>t</i>)	<i>P</i>	<i>d</i> _s [95% CI]
Resilience	22.77 (4.77)	<.001	0.77 [0.45 - 1.08]
Mental well-being (total)	14.92 (3.86)	<.001	0.62 [0.30 - 0.94]
Emotional well-being	5.53 (2.35)	.020	0.38 [0.06 - 0.69]
Social well-being	13.43 (3.67)	<.001	0.59 [0.27 - 0.91]
Psychological well-being	11.98 (3.46)	.001	0.55 [0.23 - 0.87]
Depression	9.86 (3.14)	.002	0.50 [0.19 - 0.82]
Anxiety	4.01 (-2.00)	.047	0.32 [0.01 - 0.64]
Stress	3.13 (-1.77)	.079	Not significant
IFDFW	1.04 (-1.02)	.310	Not significant
Psychological flexibility	1.69 (1.30)	.195	Not significant
Positive affect	5.67 (2.38)	.018	0.38 [0.07 - 0.70]
Negative affect	18.81 (4.34)	<.001	0.69 [0.38 - 1.01]

Follow-up effects

Three months after the intervention was completed, the follow-up assessment was conducted among the intervention group. Paired t-test results comparing the pre-test results with the follow-up results demonstrated significant within-group improvements on resilience [$t(79) = 3.23, p = 0.002$], mental well-being [$t(79) = 3.94, p < 0.001$], emotional well-being [$t(79) = 3.33, p = 0.001$], social well-being [$t(79) = 3.77, p < 0.001$], psychological well-being [$t(79) = 2.96, p = 0.004$], depression [$t(79) = 4.51, p < 0.001$], anxiety [$t(79) = 4.08, p < 0.001$], stress [$t(79) = 4.54, p < 0.001$], positive affect [$t(79) = 4.47, p < 0.001$], negative affect [$t(79) = 2.08, p = 0.041$], and financial well-being [$t(79) = 1.15, p = 0.002$]. No significant within-group difference for psychological flexibility was found in the group. These results are in line with the results of ANCOVA analyses. Paired t-test results comparing the post-test results with the follow-up results only demonstrated significant results on positive affect [$t(79) = -2.64, p = 0.02$]. Taken together these results indicate that overall improvements measured immediately after the intervention were maintained at the 3-months follow-up.

Adherence and satisfaction about the program

The mean number of attended sessions was 4.40 (SD=1.92), indicating that the attendance rate was moderate. Among members of the intervention group (80 participants) 32 (40%)

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

attended all six sessions, 18 (22.5%) attended five sessions, twelve (15%) attended four sessions, three (4%) attended three sessions, three (4%) attended two sessions, and seven (9%) attended one session. Five (6%) participants did not attend any intervention session but did attend the opening session and also completed post-test assessment at the workplace. The mean score for the overall client satisfaction of the program was 2.95 (SD=0.63), indicating a high client satisfaction. In total, 94% of the participants indicated that they were satisfied with the program. When asked to what extent the program lived up to their expectations, 14% of the participants indicated that the program did not. Regarding the question of whether the program met their needs or not, 50% of the participants reported that the program inadequately met their specific needs. However, 95% of the participants would recommend the program to others.

Discussion

The aim of this study was to examine the efficacy of a culturally adapted multi-component positive psychology intervention (MPPI) among employees in Suriname. We demonstrated that a 6-week MPPI was superior to a wait-list condition in increasing resilience and mental well-being. In addition, we found significant increases for positive affect, as well as a decrease in the levels of depression, anxiety, and negative affect. The intervention did not significantly decrease stress and financial distress, nor did it increase psychological flexibility. The effect sizes on resilience, mental well-being, and negative affect were large and thus greater than the moderate effect sizes we expected for these outcomes. In addition, we found moderate improvements on depression and positive affect, and small improvements on anxiety. Our study also showed that within-group improvements in the intervention group were maintained for up to three months. We also found significant within-group improvements on stress and financial distress when comparing the pre-test results with the 3-months follow-up results.

To date, few studies have examined the effects of PPIs on the resilience and well-being of those on the work floor. Several studies that were conducted report findings that are in line with results from our study. For example, an Australian study on the efficacy of a 5-week resilience program among 28 employees (Rogerson, Meir, Crowley-McHattan,

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

McEwen, & Pastoors, 2016) measured resilience by improvements on items such as living authentically, maintaining a positive perspective, managing stress, and building social networks. These outcomes are comparable to the dimensions of the Ryff's Scales of Psychological Well-being (Ryff, 2014). The study by Rogerson and colleagues reported significant increases in psychological well-being and a large effect size was found, which is comparable to our findings on psychological well-being. Another study among 242 employees that examined the effects of a training to increase psychological capital—a state characterized by self-efficacy, optimism, hope, and resilience—reported a significant increase in psychological well-being compared to a CBT control group (Luthans, Avey, Avolio, & Peterson, 2010). While the study consisted of a series of exercises that were designed to increase the participants' levels of self-efficacy, hope, resilience, and optimism, the intervention itself was a single 2-hour session. The reported effect size in that particular study was considerably lower than the outcome for psychological well-being in our study. The short duration of the training could have contributed to the difference in effect sizes between that study and the study we conducted. Our findings on mental well-being are comparable to the results of a recently published study on the effects of a MPPI among 275 adults with low or moderate well-being (Schotanus-Dijkstra et al., 2017). This study reported large improvements on emotional, social, and psychological well-being and anxiety, and moderate improvements on depression. While the delivery of this program differed (applying self-help instead of group-based delivery), the content of the program was comparable, with eight modules covering topics including positive emotions, identifying and using strengths, optimistic thinking, resilience, and positive relations.

Randomized controlled trials measuring the effects of PPIs from non-Western countries reported larger effect sizes than RCTS from Western countries. This is mainly attributed to the overall lower study quality of studies from non-Western countries. However, this not applicable to the present study since it demonstrates a low risk of bias and high study quality. There are two other explanations for the moderate to large effect sizes we found. First, our MPPI included a wide variety of positive activities. A meta-analysis on the efficacy of MPPIs we conducted prior to this study suggested that intervention containing multiple components are more effective than single component interventions (Hendriks, 2018), albeit that the differences were small for well-being outcomes. The Synergetic Change model (Rusk, Vella-Brodrick, & Waters, 2017) also suggests that interventions containing multiple

components that are aimed at multiple domains of psychosocial functioning may have larger effects than interventions that are targeted at a single domain. The Strong Minds Suriname program contained psycho-educational sections that primarily focused on increasing the domain 'comprehension and coping', the relaxation and breathing exercises focused on changing 'attention and awareness', expressing gratitude and discovering emotions focused on the domain 'emotions'. In addition, 'virtues and relationships' were targeted through random acts of kindness (session 2), discovering and expressing strengths (sessions 3), and the practice of forgiveness and surrendering through prayer (sessions 6). In addition, studies suggest that variety and person-activity fit are two critical factors for achieving benefits through performing positive interventions (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012; Schueller & Parks, 2014; Sheldon & Lyubomirsky, 2012). By offering a wide variety of activities in our program we aimed to increase the person-activity fit of the Strong Minds Suriname program. The second explanation for the moderate to large effect sizes is the possible influence of novelty effects. Access to mental health interventions in non-Western countries is often low (De Jong et al., 2015; Rathod et al., 2017), as is the case in Suriname. Often only higher educated staff receives professional training opportunities and being selected for a training such as the Strong Minds Suriname program can be regarded as a privilege and a novelty. Novelty effects may lead to greater enthusiasm among participants and a greater attention to a particular intervention (Ammenwerth & Rigby, 2016; Turner-McGrievy) and thereby contributing to larger effects. Finally, the study was conducted during the height of the economic recession and the fact that workers were offered a psychological intervention during this specific period could have influenced their engagement.

Strengths and limitations

The first strength of this study was its methodological rigor. Often, the quality of PPI studies from non-Western countries is low (Hendriks et al., 2018a), and low study quality is often associated with larger effect sizes (Cuijpers, van Straten, Bohlmeijer, Hollon, & Andersson, 2010). By strictly following the SPIRIT and CONSORT guidelines for RCTs (Chan & Laupacis, 2013; Moher et al., 2010) we aimed to minimize the risk of bias, thus ensuring a high study quality. For example, to minimize selection bias, we randomly allocated the participants and concealed their allocation to the conditions. The study was also partially blinded to minimize performance and detection bias. Moreover, the sample size was based on a power analysis, thus ensuring an adequate power to detect statistical significance (Suresh &

Chandrashekhara, 2012). Finally, all statistical analyses were based on a (modified) intention-to-treat analysis, thus minimizing attrition bias (Gupta, 2011). Another strength was that we conducted surface and deep structure level cultural adaptations, thereby contextualizing the intervention with the cultural backgrounds of the participants, which could have contributed to the large and moderate effect sizes.

The current RCT also has several limitations. First, we used a wait-list group for comparison, instead of an active control group or no intervention. Research shows that wait-list conditions may generate larger effect sizes than no treatment or a placebo intervention (Cunningham, Kypri, & McCambridge, 2013; Furukawa et al., 2014). It is suggested that participants in a wait-list condition expect positive change to happen once they receive an intervention, thereby stalling their natural capacity to improve (Miller & Rollnick, 1991). A recent meta-analysis on the efficacy of MPPIs also identified the control group as a significant moderator; on average, studies that used a non-active control group reported significantly larger effects on psychological well-being and stress than studies using an active control group (Hendriks, 2018). Since the control condition in our study was a wait-list group, the high effect sizes in our study may partly be due to the use of a non-active control group. Our choice for a wait-list condition over an active intervention control group was a pragmatic one. Conducting a large scale RCT is a costly enterprise and we were only able to deploy our study in Suriname through funding of three companies in the private sector. They strongly preferred that all their employees would receive the same training. In addition, alternative programs to increase resilience and well-being, for example CBT or mindfulness-based programs, are not available, neither did we have the time and means to develop such a program.

Second, we included a wide variety of positive activities in the intervention program. The disadvantage of such a mixed modality approach is that the exact mechanisms that may explain the effects cannot be determined. Perhaps some activities had smaller effects than others, or no effect whatsoever. The possibility that a particular exercise had a reverse effect cannot be ruled out. The third limitation pertains to the use of the questionnaires. Although we mostly used questionnaires that were validated among Dutch-speaking populations in the Netherlands and Belgium, the questionnaires were not validated among Dutch-speaking Surinamese populations. Questionnaires that are not validated may yield inconsistent results (Boynton & Greenhalgh, 2004). We therefore recommend the development of instruments

that are validated among the Surinamese population. Regarding the assessment procedure, we recommend limiting the number of questionnaires and items when conducting questionnaires among participants with a low education level in non-Western countries. In this way, bias due to boredom or fatigue could be limited. At post-assessment and follow-up, we observed respondent fatigue and boredom. This could have resulted in a tendency to overuse the end points of a scale, which is commonly known as extreme response style bias (He, Bartram, Inceoglu, & Van de Vijver, 2014). The fourth limitation concerns generalization of the findings to the Surinamese working population. In the current study, we used a self-selected sample of companies, which is not representative for all companies in Suriname. Participation in the training required companies to commit a substantial number of their workforce to the intervention. This reduced the scope of companies that were able to participate in the intervention.

Recommendations for future interventions

While the present study was conducted in the context of a work environment, many findings may also be relevant for public mental healthcare in Suriname. We recommend the further development, implementation, and assessment of culturally adapted MPPIs that are analogous to the Strong Minds Suriname program. Given the fact that our study was conducted by local coaches, the Strong Minds Suriname program (or a similar MPPI) could also be implemented on a larger scale among adolescents in schools if their teachers were to be trained as coaches. For future research in general, we further recommend exploring the possibilities of integrating messaging services such as WhatsApp (WhatsApp Inc., Mountain View, CA) into interventions to increase engagement and adherence. Recent studies suggest that mobile health (mHealth) applications may improve health and well-being among workers (De Korte, Wiezer, Janssen, Vink, & Kraaij, 2018). During the trial, the coaches of the program spontaneously formed a WhatsApp group, which was only accessible for the coaches and the project team. They shared positive experiences, positive media news, shared inspiring quotes, and encouraged each other. This led to greater enthusiasm and engagement on their part, which may have had a positive influence on their interactions with the participants. A group app accessible for participants could perhaps be an additional strategy to increase exposure and engagement (Birnbaum, Lewis, Rosen, & Ranney, 2015; Martin, 2012). A group app that continues after the intervention may hypothetically even prolong the effects of an intervention because it entails an element of a sustained self-help group. In addition, the

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

large majority of people in low- and middle-income countries (LMICs) often does not have access to mental health care due to due to scarcity of mental health professionals and available interventions (Saraceno et al., 2007). Mhealth applications could also provide a solution for this so-called ‘treatment gap’ in LMICs (Yellowlees & Chan, 2016).

Conclusion

To our knowledge, no randomized studies on the effects of positive psychology were conducted on the continent of South America to date. Our study demonstrated that a culturally adapted MPPI could be effective in increasing resilience and mental well-being and in decreasing depression and anxiety. It also showed that large effects sizes can be achieved, while adhering to strict norms that ensure a high study quality. This makes the current MPPI a promising intervention in the context of Suriname, other Caribbean countries with similar multi-ethnic populations such as Guyana and Trinidad and Tobago, and possibly other non-Western countries.

Ethical approval and consent to participate

The research was conducted in accordance with the regulations of the Surinamese *Wet Medisch-wetenschappelijk Onderzoek met mensen (WMO)* and the principles of the Declaration of Helsinki (59th, 2008). The trial was approved by the Ethics Committee of the University of Twente in the Netherlands (BCE16487) and registered at the Netherlands National Trial Register (NTR6157) on February 7, 2017 (Netherlands National Trial Register 2017). Written informed consent for participation in the study was obtained from all participants prior to the baseline assessment.

Competing Interests

The authors declare that they have no competing interests.

Funding

The study was funded by the University of Amsterdam and sponsored by the following participating Surinamese companies: Multi Electronic System N.V., Surinaamse Postspaarbank N.V., and the InterMed Group. Except for Wantley Sardjo, the CEO of Multi Electrical System N.V., and co-author in this study, funders had no role in, or control over the collection, management, analysis, interpretation, and publication of the data.

Availability of data and materials

Data is available at the Open Science Framework (Hendriks, 2017). Data is coded to ensure anonymity of the participants.

Acknowledgements

We would like to thank Emeritus Professor Jan Walburg and Rijkwessel de Valk, formerly at Royal Dutch Shell, for the use of the original Shell Resilience Program. We would also like to thank the following Surinamese psychologists for participating in the focus groups: Dr. Glenn Leckie, Drs. Maja Heijmans-Goedschalk, and Drs. Mavis Hoost.

References

- American Psychological Association. (2017). *The road to resilience*. Retrieved from <http://www.apa.org/helpcenter/road-resilience.aspx>.
- Ammenwerth, E., & Rigby, M. (2016). *Evidence-based health informatics: Promoting safety and efficiency through scientific methods and ethical policy* (Vol. 222). Amsterdam: Ios Press.
- Antamarian, S. P., Scott Huebner, E., Hills, K. J., & Valois, R. F. (2010). A dual-factor model of mental health: Toward a more comprehensive understanding of youth functioning. *American Journal of Orthopsychiatry*, 80(4), 462-472.
- Arnetz, B. B., Nevedal, D. C., Lumley, M. A., Backman, L., & Lublin, A. (2009). Trauma resilience training for police: Psychophysiological and performance effect. *Journal of Police and Criminal Psychology*, 24, 1-9.
- Bandler, R., Grinder, J., & Andreas, S. (1982). *Refraining. Neuro-Linguistic Programming™ and the Transformation of Meaning*. Moab, Utah: Real People Press.
- Ben-Itzhak, S., Bluvstein, I., & Maor, M. (2014). The psychological flexibility questionnaire (PFQ): Development, reliability and validity. *WebmedCentral PSYCHOLOGY* 2014;5(4):WMC004606.
- Bernal, G., & Domenech-Rodriguez, M. M. (2012). Cultural adaptation in context: Psychotherapy as a historical account of adaptations. In M. M. Domenech Rodriguez

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- & G. Bernal (Eds.), *Cultural adaptations: Tools for evidence-based practice with diverse populations* (pp. 3-22). Baltimore, MD: United Book Press, Inc.
- Berry, J. W. (2013). Global psychology. *South African Journal of Psychology*, 43(4), 391-401.
- Best, L. (1967). Independent thought and Caribbean freedom. *New World Quarterly*, 3(4), 7-26.
- Betancourt, T. S., Meyers-Ohki, M. S. E., Charrow, M. A. P., & Tol, W. A. (2013). Interventions for children affected by war: an ecological perspective on psychosocial support and mental health care. *Harvard Review of Psychiatry*, 21(2), 70.
- Birnbaum, F., Lewis, D., Rosen, R. K., & Ranney, M. L. (2015). Patient engagement and the design of digital health. *Academic Emergency Medicine*, 22(6), 754-756.
- Borsboom, D. (2017). A network theory of mental disorders. *World Psychiatry*, 16(1), 5-13.
- Boynton, P. M., & Greenhalgh, T. (2004). Hands-on guide to questionnaire research: Selecting, designing, and developing your questionnaire. *BMJ: British Medical Journal*, 328(7451), 1312.
- Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *Journal of Social Psychology*, 150, 235-237.
- Burton, N. W., Pakenham, K. I., & Brown, W. J. (2010). Feasibility and effectiveness of psychosocial resilience training: a pilot study of the READY program. *Psychology, Health & Medicine*, 15(3), 266-277.
- Castro, F. G., Barrera, M., & Martinez, C. R. (2004). The cultural adaptation of prevention interventions: Resolving tensions between fidelity and fit. *Prevention Science*, 5(1), 41-45.
- Chan, A.-W., Tetzlaff, J. M., Gøtzsche, P. C., Altman, D. G., Mann, H., Berlin, J. A., Dickersin, K., Hróbjartsson, A., Schulz, K.F., Parulekar, W.R, Krleža-Jeric, K., 10, & Laupacis, A., & Moher, D. (2013). SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ*, 346, e7586.
- Choy, J. C., & Lou, V. W. (2016). Effectiveness of the modified instrumental reminiscence intervention on psychological well-being among community-dwelling Chinese older adults: A randomized controlled trial. *The American Journal of Geriatric Psychiatry*, 24(1), 60-69.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Christopher, J. C., Wendt, D. C., Marecek, J., & Goodman, D. M. (2014). Critical cultural awareness: Contributions to a globalizing psychology. *American Psychologist, 69*(7), 645.
- Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: positive emotions increase life satisfaction by building resilience. *Emotion, 9*(3), 361.
- Cramer, A. O. J., Waldorp, L. J., Maas, H. L. J. van der, & Borsboom, D. (2010). Comorbidity: A network perspective. *Behavioral and Brain Sciences, 33*(2/3).
- Cuijpers, P., van Straten, A., Bohlmeijer, E., Hollon, S., & Andersson, G. (2010). The effects of psychotherapy for adult depression are overestimated: a meta-analysis of study quality and effect size. *Psychological Medicine, 40*(2), 211-223.
- Cunningham, J. A., Kypri, K., & McCambridge, J. (2013). Exploratory randomized controlled trial evaluating the impact of a waiting list control design. *BMC Medical Research Methodology, 13*(1), 150.
- Darwish, A.-F. E., & Huber, G. L. (2003). Individualism vs collectivism in different cultures: a cross-cultural study. *Intercultural Education, 14*(1), 47-56.
- de Beurs, E., van Zweden, S., & Hamming, C. (2010). De bruikbaarheid van de DASS voor evaluatie van de behandeling van arbeidsgerelateerde psychische klachten. *TBV–Tijdschrift voor Bedrijfs-en Verzekeringsgeneeskunde, 18*(3), 103-109.
- de Jong, J. T., Berckmoes, L. H., Kohrt, B. A., Song, S. J., Tol, W. A., & Reis, R. (2015). A public health approach to address the mental health burden of youth in situations of political violence and humanitarian emergencies. *Current Psychiatry Reports, 17*(7), 60. doi 10.1007/s11920-015-0590-0.
- de Korte, E. M., Wiezer, N., Janssen, J. H., Vink, P., & Kraaij, W. (2018). Evaluating an mHealth App for Health and Well-Being at Work: Mixed-Method Qualitative Study. *JMIR mHealth and uHealth, 6*(3).
- de Valk, R. (2013). Het Shell resilience-programma: Veerkracht ontwikkelen. *Arbo*(4), 12015.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Dempster, A. P., Laird, N. M., & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm. *Journal of the Royal Statistical society. Series B (methodological)*, 1-38.
- Domenech-Rodriguez, M., & Wieling, E. (2004). Developing culturally appropriate, evidence-based treatments for interventions with ethnic minority populations. In M. R. E. Weiling (Ed.), *Voices of color: First person accounts of ethnic minority therapists* (pp. 313-333). Thousand Oaks, CA: Sage.
- Donaldson, S. I., Dollwet, M., & Rao, M. A. (2015). Happiness, excellence, and optimal human functioning revisited: Examining the peer-reviewed literature linked to positive psychology. *The Journal of Positive Psychology*, 10(3), 185-195.
- Emmons, R. A., & Stern, R. (2013). Gratitude as a psychotherapeutic intervention. *Journal of Clinical Psychology*, 69(8), 846-855.
- Engelen, U., de Peuter, S., Victoir, A., van Diest, I., & van den Bergh, O. (2006). Verdere validering van de Positive and Negative Affect Schedule (PANAS) en vergelijking van twee Nederlandstalige versies. *Gedrag en Gezondheid*, 34(2), 61-70.
- Fletcher, D., & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts, and theory. *European Psychologist*, 18(1), 12.
- Friborg, O., Hjemdal, O., Martinussen, M., & Rosenvinge, J. H. (2009). Empirical support for resilience as more than the counterpart and absence of vulnerability and symptoms of mental disorder. *Journal of Individual Differences*, 30(3), 138-151.
- Furukawa, T., Noma, H., Caldwell, D., Honyashiki, M., Shinohara, K., Imai, H., . . . Churchill, R. (2014). Waiting list may be a nocebo condition in psychotherapy trials: a contribution from network meta-analysis. *Acta Psychiatrica Scandinavica*, 130(3), 181-192.
- Ganesan, M. (2006). Psychosocial response to disasters—some concerns. *International Review of Psychiatry*, 18(3), 241-247.
- Garnezy, N. (1993). Children in poverty: resilience despite risk. *Psychiatry*, 56(1), 127–136.
- Gillham, J., Brunwasser, S. M., & Freres, D. R. (2008). *Preventing depression in early adolescence* (pp. 309-322). Guilford Press: New York, NY, USA.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Grafton, E., Gillespie, B., & Henderson, S. (2010). Resilience: the power within. *Oncology Nursing Forum*, 37(6), 698-705.
- Greenspoon, P. J., & Saklofske, D. H. (2001). Toward an integration of subjective well-being and psychopathology. *Social Indicators Research*, 54(1), 81-108.
- Gunderson, L. (2010). Ecological and human community resilience in response to natural disasters. *Ecology and Society*, 15(2), 18.
- Gupta, S. K. (2011). Intention-to-treat concept: a review. *Perspectives in Clinical Research*, 2(3), 109.
- Harms, P. D., Brady, L., Wood, D., & Silard, A. (2018). Resilience and well-being. In E. Diener, S., Oishi, & L. Tay (Eds.), *Handbook of well-being*. Salt Lake City, UT: DEF Publishers.
- He, J., Bartram, D., Inceoglu, I., & Van de Vijver, F. J. (2014). Response styles and personality traits: A multilevel analysis. *Journal of Cross-Cultural Psychology*, 45(7), 1028-1045.
- Hendriks, T. (2017). Strong Minds Suriname. Retrieved from <https://osf.io/fumzd/>
- Hendriks, T. (2018). *Positive psychology interventions in a multi-ethnic and cross-cultural context*. University of Amsterdam, Amsterdam.
- Hendriks, T., Graafsma, T., Hassankhan, A., Bohlmeijer, E., & de Jong, J. (2018). Strengths and virtues and the development of resilience: A qualitative study in Suriname during a time of economic crisis. *International Journal of Social Psychiatry*, 64(2), 180-188.
- Hendriks, T., Schotanus-Dijkstra, M., Hassankhan, A., Graafsma, T., de Jong, J., & Bohlmeijer, E. T. (2019). The efficacy of multicomponent positive psychology interventions: a meta-analysis. *The Journal of Happiness Studies*, Manuscript accepted for publication.
- Hendriks, T., Schotanus-Dijkstra, M., Hassankhan, A., Graafsma, T., Bohlmeijer, E. T., & de Jong, J. (2018a). The efficacy of non-Western positive psychology interventions: a meta-analysis and systematic review. *International Journal of Wellbeing*, 8(1), 71-98.
- Hendriks, T., Warren, M. A., Schotanus-Dijkstra, M., Hassankhan, A., Graafsma, T., Bohlmeijer, E., & de Jong, J. (2018b). How WEIRD are positive psychology interventions? A bibliometric analysis of randomized controlled trials on the science of well-being. *The Journal of Positive Psychology*, 1-13.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, 466(7302), 29-29.
- Heritier, S. R., Gebiski, V. J., & Keech, A. C. (2003). Inclusion of patients in clinical trial analysis: the intention-to-treat principle. *Medical Journal of Australia*, 179(8), 438-440.
- Hildering van Lith, S. D. M. (2015). *Positive psychology in the workplace: A study of the Shell Resilience Program*. Master's Thesis. University of Maastricht, University of Twente.
- Hinton, D. E., Jalal, B. (2014). Guidelines for the implementation of culturally sensitive CBT among refugees and in global contexts. *Intervention*, 12(1), 78-93.
- Hobfoll, S. E., & de Jong, J.V.T.M. (2014). Sociocultural and ecological factors. In L. A. Zoellmer & N. C. Feeny (Eds.), *Facilitating Resilience and Recovery* (pp. 69-90). New York: The Guilford Press.
- Hollis, S., & Campbell, F. (1999). What is meant by intention to treat analysis? Survey of published randomised controlled trials. *BMJ*, 319(7211), 670-674.
- Horner, S., Rew, L., & Torres, R. (2006). Enhancing intervention fidelity: a means of strengthening study impact. *Journal for Specialists in Pediatric Nursing*, 11(2), 80-89.
- Hu, T., Zhang, D., & Wang, J. (2015). A meta-analysis of the trait resilience and mental health. *Personality and Individual Differences*, 76, 18-27.
- Huitema, B. (2011). *The analysis of covariance and alternatives: Statistical methods for experiments, quasi-experiments, and single-case studies* (Vol. 608): John Wiley & Sons.
- Hunter, A. (2007). Forgiveness: Hindu and western perspectives. *Journal of Hindu-Christian Studies*, 20(1), 11.
- Huppert, F. A., & So, T. T. (2013). Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research*, 110(3), 837-861.
- Hwang, W.-C. (2006). The psychotherapy adaptation and modification framework: Application to Asian Americans. *American Psychologist*, 61(7), 702.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Ifeagwazi, C. M., Chukwuorji, J. C., & Zacchaeus, E. A. (2015). Alienation and psychological wellbeing: Moderation by resilience. *Social Indicators Research*, 120(2), 525-544.
- Jackson, D., Firtko, A., & Edenborough, M. (2007). Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: A literature review. *Journal of Advanced Nursing*, 60(1), 1-9.
- Jahoda, G. (2016). On the rise and decline of 'indigenous psychology'. *Culture & Psychology*, 22(2), 169-181.
- Ji, M., Hui, E., Fu, H., Watkins, D., Tao, L., & Lo, S. K. (2016). Effects of a culture-adaptive forgiveness intervention for Chinese college students. *British Journal of Guidance & Counselling*, 44(3), 335-346.
- Joyce, S., Shand, F., Tighe, J., Laurent, S. J., Bryant, R. A., & Harvey, S. B. (2018). Road to resilience: a systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open*, 8(6), e017858.
- Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: a complementary strategy for improving national mental health. *American Psychologist*, 62, 95-108.
- Kim, H., Doiron, K. M., Warren, M. A., & Donaldson, S. I. (2018). The international landscape of positive psychology research: A systematic review. *International Journal of Wellbeing*, 8(1), 50-70.
- Kuntz, J. R., Näswall, K., & Malinen, S. (2016). Resilient employees in resilient organizations: Flourishing beyond adversity. *Industrial and Organizational Psychology*, 9(2), 456-462
- La Caze, A., & Duffull, S. (2011). Estimating risk from underpowered, but statistically significant, studies: was APPROVe on TARGET? *Journal of Clinical Pharmacy and Therapeutics*, 36(6), 637-641.
- La Roche, M. J., & Lustig, K. (2010). Cultural adaptations: Unpacking the meaning of culture. *Scientific Review of Mental Health Practice*, 7(2).
- Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4. Converter downloaded from <https://sites.google.com/site/lakens2/effect-sizes>.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Lamers, S., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. (2011). Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF). *Journal of Clinical Psychology, 67*(1), 99-110.
- Larsen, D. L., Attkisson, C. C., Hargreaves, W. A., & Nguyen, T. D. (1979). Assessment of client/patient satisfaction: development of a general scale. *Evaluation and Program Planning, 2*(3), 197-207.
- Lau, A. S. (2006). Making the case for selective and directed cultural adaptations of evidence-based treatments: examples from parent training. *Clinical Psychology: Science and Practice, 13*(4), 295-310.
- Linley, A., Willars, J., Biswas-Deiner, R., Garcea, N., & Stairs, M. (2010). *The strengths book: Be confident, be successful and enjoy better relationships by realising the best of you*. Coventry: Capp Press.
- Luthans, F., Avey, J.B., Avolio, B.J., & Peterson, S. J. (2010). The development and resulting performance impact of positive psychological capital. *Human Resource Development Quarterly, 21*, 41-67.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543-562.
- Luthar, S. S., Lyman, E. L., & Crossman, E. J. (2014). Resilience and positive psychology. In M. Lewis & K. D. Rudolph (Eds.), *Handbook of Developmental Psychopathology* (pp. 125-140). New York: Springer Science Business Media.
- Marsella, A. J., & Yamada, A. M. (2010). Culture and psychopathology: Foundations, issues, directions. *Journal of Pacific Rim Psychology, 4*(2), 103-115.
- Martin, T. (2012). Assessing mHealth: opportunities and barriers to patient engagement. *Journal of Health Care for the Poor and Underserved, 23*(3), 935-941.
- Martinez Jr, C. R. (2006). Effects of differential family acculturation on Latino adolescent substance use. *Family Relations, 55*(3), 306-317.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist, 56*(3), 227.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- McCraty, R., & Atkinson, M. (2012). Resilience training program reduces physiological and psychological stress in police officers. *Global Advances in Health and Medicine, 1*(5), 44-66.
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York: Guilford Press.
- Miller-Lewis, L. R., Searle, A. K., Sawyer, M. G., Baghurst, P. A., & Hedley, D. (2013). Resource factors for mental health resilience in early childhood: An analysis with multiple methodologies. *Child and Adolescent Psychiatry Mental Health, 7*(1), 6.
- Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gøtzsche, P. C., Devereaux, P. J., . . . Altman, D. (2010). CONSORT 2010 Explanation and Elaboration: updated guidelines for reporting parallel group randomized trials. *BMJ, 340*, c869.
- Murray, L. L. (2013). Limited evidence that neurolinguistic programming improves health-related outcomes. *Evidence-based Mental Health, 16*(3), 79.
- Nakagawa, S., & Cuthill, I. C. (2007). Effect size, confidence interval and statistical significance: a practical guide for biologists. *Biological Reviews, 82*(4), 591-605.
- Netherlands National Trial Register (2017). Retrieved from <http://www.trialregister.nl/trialreg/admin/rctview.asp?TC=6157>.
- Ooft, G. (2016). *Inflation and economic activity in Suriname*. Centrale Bank van Suriname. Retrieved from http://www.ccmfuwi.org/files/publications/conference/2016/4_2-Ooft-p.pdf.
- Owusu-Bempah, K., & Howitt, D. (2000). *Psychology beyond Western perspectives*. Wiley-Blackwell.
- Parks, A. C., Della Porta, M. D., Pierce, R. S., Zilca, R., & Lyubomirsky, S. (2012). Pursuing happiness in everyday life: The characteristics and behaviors of online happiness seekers. *Emotion, 12*(6), 1222.
- Peterson, C., & Seligman, M. E. (2004). *Character strengths and virtues: A handbook and classification*. Oxford University Press.
- Portzky, M., Wagnild, G., De Bacquer, D., & Audenaert, K. (2010). Psychometric evaluation of the Dutch Resilience Scale RS-nl on 3265 healthy participants: a confirmation of

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

the association between age and resilience found with the Swedish version.

Scandinavian Journal of Caring Sciences, 24(s1), 86-92.

Prawitz, A. D., Garman, E. T., Sorhaindo, B., O'Neill, B., Kim, J., & Drentea, P. (2006).

InCharge financial distress/financial well-being scale: Development, administration, and score interpretation. *Journal of Financial Counseling and Planning*, 17(1).

Rathod, S., Pinninti, N., Irfan, M., Gorczynski, P., Rathod, P., Gega, L., & Naeem, F. (2017).

Mental health service provision in low-and middle-income countries. *Health Services Insights*, 10, 1178632917694350.

Rausch, J. R., Maxwell, S. E., & Kelley, K. (2003). Analytic methods for questions

pertaining to a randomized pretest, posttest, follow-up design. *Journal of Clinical Child and Adolescent Psychology*, 32(3), 467-486.

Resnicow, K., Soler, R., Braithwaite, R. L., Ahluwalia, J. S., & Butler, J. (2000). Cultural

sensitivity in substance use prevention. *Journal of Community Psychology*, 28(3), 271-290.

Rogerson, S., Meir, R., Crowley-McHattan, Z., McEwen, K., & Pastoors, R. (2016). A

randomized controlled pilot trial investigating the impact of a workplace resilience program during a time of significant organizational change. *Journal of Occupational and Environmental Medicine*, 58(4), 329-334.

Rusk, R. D., Vella-Brodrick, D. A., & Waters, L. (2017). A complex dynamic systems

approach to lasting positive change: The Synergistic Change Model. *The Journal of Positive Psychology*, 1-13.

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry*, 57(3), 316-331.

Ryff, C. D. (2014). Psychological well-being revisited: Advances in the science and practice

of eudaimonia. *Psychotherapy and Psychosomatics*, 83(1), 10-28.

Saraceno, B., van Ommeren, M., Batniji, R., Cohen, A., Gureje, O., Mahoney, J., . . .

Underhill, C. (2007). Barriers to improvement of mental health services in low-income and middle-income countries. *The Lancet*, 370(9593), 1164-1174.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- Schotanus-Dijkstra, M., Drossaert, C. H., Pieterse, M. E., Boon, B., Walburg, J. A., & Bohlmeijer, E. T. (2017). An early intervention to promote well-being and flourishing and reduce anxiety and depression: A randomized controlled trial. *Internet Interventions, 9*, 15-24.
- Schueller, S. M., & Parks, A. C. (2014). The science of self-help. *European Psychologist, 19*(2), 145-155.
- Seligman, M. E. P., Steen, T.A., Park, N., & Peterson, C. (2005). Positive psychology progress: empirical validation of intervention. *American Psychologist, 60*(5), 410–421.
- Sexton, M. B., Hamilton, L., McGinnis, E. W., Rosenblum, K. L., & Muzik, M. (2015). The roles of resilience and childhood trauma history: main and moderating effects on postpartum maternal mental health and functioning. *Journal of Affective Disorders, 174*, 562-568.
- Sheldon, K. M., & Lyubomirsky, S. (2012). The challenge of staying happier: Testing the hedonic adaptation prevention model. *Personality and Social Psychology Bulletin, 38*(5), 670-680.
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology, 65*, 467–487.
- Smith, T., Domenech- Rodriguez, M. M., & Bernal, G. (2010). Culture. *Journal of Clinical Psychology, 67*, 166–175.
- Sturt, J., Ali, S., Robertson, W., Metcalfe, D., Grove, A., Bourne, C., & Bridle, C. (2012). Neurolinguistic programming: a systematic review of the effects on health outcomes. *British Journal of General Practice, 62*(604), e757-e764.
- Suresh, K., & Chandrashekara, S. (2012). Sample size estimation and power analysis for clinical research studies. *Journal of Human Reproductive Sciences, 5*(1), 7.
- Tao, L. J., & Fu, H. (2010). Forgiveness therapy: A practice of psychotherapy restricted by culture. *Medicine & Philosophy (Humanistic & Social Medicine Edition), 31*, 45-47.
- The World Bank. (2016). Country overview Suriname. Retrieved from <http://www.worldbank.org/en/country/suriname/overview>

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

- TradingEconomics. (2018). Suriname Inflation Rate 1969-2018. Retrieved from <https://tradingeconomics.com/suriname/inflation-cpi?embed>
- Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology, 86*(2), 320.
- Turner-McGrievy, G., Kalyanaraman, S., & Campbell, M. K. (2013). Delivering health information via podcast or web: Media effects on psychosocial and physiological responses. *Health Communication, 28*(2), 101-109.
- Ungar, M., Ghazinour, M., & Richter, J. (2013). Annual research review: What is resilience within the social ecology of human development? *Journal of Child Psychology and Psychiatry, 54*(4), 348-366.
- van der Kooij, I. W., Nieuwendam, J., Bipat, S., Boer, F., Lindauer, R. J., & Graafsma, T. L. (2015). A national study on the prevalence of child abuse and neglect in Suriname. *Child Abuse and Neglect, 47*, 153-161.
- Wagnild, G., & Young, H. (1993). Development and psychometric. *Journal of nursing measurement, 1*(2), 165-178.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.
- Werner, E. E. (1993). Risk, resilience and recovery: Perspectives from the Kauai longitudinal study. *Development and Psychopathology, 5*, 503-515.
- Westerhof, G. J., & Keyes, C. L. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development, 17*(2), 110-119.
- Witkowski, T. (2010). Thirty-five years of research on Neuro-Linguistic Programming. NLP research data base. State of the art or pseudoscientific decoration? *Polish Psychological Bulletin, 41*(2), 58.
- Yellowlees, P., & Chan, S. (2015). Mobile mental health care-An opportunity for India. *The Indian Journal of Medical Research, 142*(4), 359.
- Zautra, A. J., Hall, J.S., & Murray, K.E. (2008). Resilience: a new integrative approach to health and mental health research. *Health Psychology Review, 2*(1), 41-64.

RESILIENCE AND WELL-BEING IN THE CARIBBEAN

Zhang, T., Fu, H., & Wan, Y. (2014). The application of group forgiveness intervention for courtship-hurt college students: A Chinese perspective. *International Journal of Group Psychotherapy*, 64(3), 299-320.

Appendix 1: Overview of the sessions and activities of the Strong Minds Suriname program

#	Session	Positive activities
1	Be grateful <i>Gran Tangi: wees dankbaar</i>	<ul style="list-style-type: none"> • Psycho-education on gratitude • Relaxation, breathing exercise (i) • Writing down a gratitude statement (i) • Verbally expressing gratitude (g) • Writing a gratitude letter (i) • Closing moment: verbal expression of positive emotions (g) • Home work (optional): gratitude visit (i), three good things (i)
2	Positivity starts with you <i>Positiviteit begint bij jezelf</i>	<ul style="list-style-type: none"> • Psycho-education on positive and negative emotions (i) • Relaxation, breathing exercise (i) • Reflection on homework assignments (g) • Discovering and discussing positive and negative emotions (g) • Outdoor random acts of kindness and presentation (g) • Closing moment: verbal expression of positive emotions (g) • Home work (optional): gratitude visit (i), three good things (i), random acts of kindness at home or work (i)
3	Developing your own strengths <i>Bouw aan je sterke kanten</i>	<ul style="list-style-type: none"> • Psycho-education on strengths • Relaxation, breathing exercise (i) • Reflection on homework assignments (g) • Discovering strengths (g) • Creating a strength symbol/strength word cloud (g) • Closing moment: verbal expression of positive emotions (g) • Home work (optional): gratitude visit (i), three good things (i), random acts of kindness at home or work, using strengths at work or at home (i)
4	Your goals are attainable <i>Jouw doelen zijn haalbaar</i>	<ul style="list-style-type: none"> • Psycho-education on goal setting (SMART goals) • Physical exercise (i) • Reflection on homework assignments (g) • Discussion on goal setting, Checking and developing a SMART goal • Closing moment: verbal expression of positive emotions (g)
5	Over coming your problems <i>Je problemen overwinnen</i>	<ul style="list-style-type: none"> • Psycho-education on Adversity/Belief and Consequences • Written exercises in changing negative to positive beliefs • Closing moment: verbal expression of positive emotions (g)
6	Let it go <i>Laat het los</i>	<ul style="list-style-type: none"> • Psycho-education on forgiveness and spirituality • Moment of silence: exercise in thoughtless awareness (i) • Forgiveness exercise (writing and verbal expression) (g/i) • Expressing gratitude through prayer and surrendering (i) • Closing moment: verbal expression of positive emotions (g)

(i): individual exercise; (g): group exercise

Appendix 2. Overview of cultural adaptations of Strong Minds Suriname program

Phase, level*	Adaptation
1, DSL	<ul style="list-style-type: none"> • Conducting 25 interviews with key representatives to uncover factors associated with resilience in Suriname
1, DSL	<ul style="list-style-type: none"> • Selecting six resilience themes that were highly relevant for the target population through focus group meetings
1, DSL	<ul style="list-style-type: none"> • Replacing original NLP – based exercises with positive psychology activities with a focus on group-based activities
2, SSL	<ul style="list-style-type: none"> • Selecting cultural appropriate strengths from the Values in Action (VIA) Classification of Strengths (Peterson & Seligman, 2004) and Linley's Strengths Book (Linley, Willars, Biswas-Deiner, Garcea, & Stairs, 2010) and integrating them into module 3.
2, SSL	<ul style="list-style-type: none"> • Screening and self-report questionnaires for semantic and conceptual equivalence and adaptation of questionnaires by a focus group of local psychologists.
2, SSL	<ul style="list-style-type: none"> • Renaming original theme titles
2+3, SSL	<ul style="list-style-type: none"> • Developing a training manual for the coaches
2+3, SSL	<ul style="list-style-type: none"> • Screening training manual for the participants for semantic and conceptual equivalence and adaptation of the manuals
2, SSL	<ul style="list-style-type: none"> • Development of a gratitude journal as a homework assignment
2, DSL	<ul style="list-style-type: none"> • Developing a module (6) that featured asking forgiveness from a higher power, expressing gratitude through prayer and surrendering problems to a higher power
3, DSL	<ul style="list-style-type: none"> • Training nine employees of various ethnic backgrounds as coaches who would assist the participants with the activities in the program
3, SSL	<ul style="list-style-type: none"> • Conducting an official opening of the program with high status representatives from the University of Suriname and the CEO's of the participating companies
3, SSL	<ul style="list-style-type: none"> • Conducting psycho-education segment of training sessions in a combination of Dutch and Sranangtongo
3, SSL	<ul style="list-style-type: none"> • Development of power point slides using images representing all ethnic groups in Suriname
3, SSL	<ul style="list-style-type: none"> • Using cultural sensitive images, local symbols, metaphors, sayings, local anecdotes and concepts in the psycho-education section of sessions
3, DSL	<ul style="list-style-type: none"> • Random assignment of coaches to subgroups, to avoid that people of the same company and/or same ethnic background would cluster during the intervention sessions
3, SSL	<ul style="list-style-type: none"> • Awarding the certificates of participation

* SSL: Surface structure level, DSL: Surface structure level