Pilot Evaluation of a Brief Emotion Regulation Intervention for Secondary School Students in Post-Earthquake Nepal

Megan K. Ramaiya

A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Science

University of Washington

2018

Committee:

Jane M. Simoni

Shannon Dorsey

Program Authorized to Offer Degree:

Psychology

University of Washington

Abstract

Pilot Evaluation of a Brief Emotion Regulation Intervention for Secondary School Students in Post-Earthquake Nepal

Megan K. Ramaiya

Chair of the Supervisory Committee:

Jane M. Simoni

Department of Psychology

Background: Child and adolescent mental health problems are major contributors to the global burden of disease, with the majority of the mental health burden concentrated in low- and middle-income country (LMIC) settings. To advance the evidence base for adolescent mental health interventions in LMICs, we piloted and evaluated the preliminary efficacy of a culturally adapted emotion regulation intervention (Regulating Emotions thought Adapted Dialectical behavior skills for Youth; READY-Nepal) for earthquake-exposed adolescents in Nepal. Methods**:** A gender-stratified, quasi-experimental design was conducted targeting Nepali secondary school students in one heavily affected post-earthquake district. A total of 102 adolescents (age 13 to 18) were enrolled in the group-based intervention. The primary outcome (emotion regulation) and secondary outcomes (coping skills, anxiety, trauma, functioning, resilience, and suicidal ideation) were measured at baseline and follow-up (four weeks). Results: Contrary to our hypotheses, we found no difference by arm either primary or secondary

outcomes at four-week follow-up, with the exception of functioning (with control participants reporting greater improvement than intervention participants). Across arms, females reported greater reductions in anxiety and trauma symptoms relative to males.

Conclusion: Further research, including investigation of optimal program dosage, delivery formats, and cultural models of emotion regulation, is necessary to explore the potential of school-based emotion regulation interventions in Nepal and other LMICs.

Pilot Evaluation of a Brief Emotion Regulation Intervention for

Secondary School Students in Post-Earthquake Nepal

Child and adolescent mental health problems are major contributors to the global burden of disease (Patel et al., 2007). Mental health problems affect an estimated 10-20% of adolescents, with youth in low- and middle-income countries (LMICs) disproportionately impacted due to high levels of political unrest, economic and social hardship, and chronically low access to evidence-based mental health services (Fazel, Patel, Thomas & Tol, 2015). The World Health Organization (WHO) estimates that, unless targeted efforts are underway to address mental health needs during this key socio-developmental window, one in three children and adolescents will experience one or more episodes of mental illness by 2050 (WHO, 2013).

Though factors contributing to mental health symptomatology among youth are heterogeneous, exposure to environmental and political trauma has emerged remains a consistent risk factor underlying the development of mental health and psychosocial problems (Stichick, 2001). Prior studies in LMICs have demonstrated a higher prevalence of psychiatric and psychological disorders among children and adolescents exposed to political violence (Attanayake et al., 2009), as well as among youth exposed to a wide range of natural disasters (e.g., Norris et al., 2002). In Nepal, specifically, a violent 7.8 magnitude earthquake struck Nepal's central region in 2015, resulting in an estimated 9,000 deaths and 22,000 injuries as well as significant damage to homes, government buildings, health facilities and road networks (Neupane, 2015). Post-earthquake estimates indicated a consistent rise in depression, anxiety, and stress-related symptoms, with higher needs of support services indicated for women and adolescents under the age of 18 (Luitel et al., 2016). Although a host of foreign and non-governmental services were rapidly deployed in affected districts during the immediate aftermath

of the disaster, services were often brief, isolated, and fragmentary, with virtually no programs resulting in coordinated efforts to sustainably address a large number of affected individuals.

School settings provide a unique opportunity for addressing the mental health needs of conflict-affected youth. Schools are found in abundance throughout both the urban and rural landscape in LMICs, with overall rates of attendance dramatically improving since 2000 (Fazel et al., 2015). In a number of high-income countries (HICs), they have provided a scalable and efficient platform to target risk factors and strengthen protective factors prior to peak emergence of mental health conditions. They also provide a natural and readily accessible source of trainable human resource capital in the form of teaching professionals, which may be a critical component in reducing the treatment gap in LMICs. Opportunities for integration within the broader education system also make school-based settings attractive locations for sustainably addressing youth mental health needs.

The rising interest in these programs mirrors recognition of the mental health needs of school-going adolescents globally. Due to economic and social pressures at individual and family levels, for instance, many school-going adolescents in LMICs are tasked with adult responsibilities at a young age, with added social and financial obligations compounding mental health stressors commonly experienced during this developmental period (Patel, Fisher, Hetrick & McGorry, 2007). In a study of secondary school students in Nepal, frequently endorsed stressors included high parental expectations, tests and exams, and other academic responsibilities (Sreeramareddy et al., 2007). Reports of these stressors were associated with psychological morbidity, which affected over 20% of the sample. Another study reported that 25% of adolescents experienced psychosocial problems including suicide and self-harm, anxiety, depression, attention problems, and delinquent behavior (Karki et al., 2015). One in five

adolescents had also endorsed lifetime suicidal ideation. Despite the sizeable psychological burden present in this demographic, however, mental health provision has been chronically un-prioritized in LMICs and further compounded by issues ranging from community and provider stigma, poor training, wide implementation of non-evidence-based interventions, and minimal integration into existing healthcare infrastructures.

One barrier to addressing youth mental health needs in LMICs is the weak and mixed evidence base for the efficacy of school-based programs. To date, only seven rigorous trials have been examined the effects of psychosocial interventions designed specifically for trauma-exposed youth in LMICs. In Indonesia, one trial demonstrated efficacy of a Classroom-Based Intervention (CBI) in reducing symptoms of post-traumatic stress disorder (PTSD) among school children (Tol, Komproe, Susanty, Jordans, & de Jong, 2008). Other trials in Sri Lanka (Tol et al., 2012) and Palestine (Peltonen et al., 2012) implementing a similar intervention, however, found no detectable effects between experimental and control conditions. In one recent systematic review of these and other school-based treatment studies for conflict-affected youth, results indicated a lack of rigorous studies, use of divergent interventions, a skewed PTSD focus, and mixed results, with less than half of the 22 studies resulting in positive findings and a fraction supporting iatrogenesis (Fazel et al., 2015). In Nepal, specifically, the only evaluation of a classroom-based intervention is Jordans and colleagues (2010) study, which preferentially targeted students experiencing moderate-to-severe distress following civil conflict. Given the scarce and heterogeneous evidence base for classroom-based interventions in resource-strained settings, it is crucial to implement novel treatment outcome studies.

Objective

The objective of this study was to contribute to the narrow evidence base for psychosocial interventions for adolescents exposed to environmental and disaster-related trauma in LMICs. This paper describes a novel pilot trial to evaluate the preliminary efficacy of a brief, school-based emotion regulation intervention targeting broad prevention of mental health symptomatology and increases in positive mental health among disaster-exposed youth in Nepal.

We chose dialectical behavior therapy (DBT; Linehan, 1993a; 1993b) as the overarching treatment model for this population for a number of reasons. First, DBT is a third-generation cognitive behavioral therapy that emphasizes a flexible, contextual, and principle-driven view of behaviors (Hayes, Villatte, Levin & Hildebrandt, 2011). Delivery of DBT requires tailoring of techniques or strategies to the client's unique set of circumstances. Because of this inherent flexibility, it was considered ideal for cultural modification with ethnic Nepalis. Second, DBT's emphasis on teaching practical, real-world skills via group setting allowed for development of a manualized protocol for use by lay Nepali counselors or other paraprofessionals with limited-to-no prior mental health experience. Third, DBT explicitly integrates Zen Buddhist principles, mindfulness, and acceptance into treatment (Robins & Chapman, 2004). Its conceptualization of clients and events using these Buddhist perspectives had the theoretical potential to align with Nepali ethnopsychological[1] divisions of the mind, body, and self (Kohrt & Harper, 2008). Fourth, DBT's emphasis on treating core processes of emotion dysregulation (Neacsiu et al., 2014) allowed us to target a wide and flexible range of transdiagnostic mental health problems common among adolescents more broadly. (See Figure 1 for a description and explanation of an

[1] Ethnopsychology is defined as the study of cultural or "folk" models of psychological subjectivity (Kohrt & Harper, 2008), and is considered a powerful means of uncovering a culture's own understanding and experience of the self, emotions, physical body, and connections to the social world.

adapted Nepali variant of the emotion regulation model.) Prior research in Nepal has demonstrated the promising utility of emotion regulation-focused interventions in reducing a range of psychopathology (e.g., depression, anxiety, post-traumatic stress) in both youth and adult populations (Ramaiya et al., 2017, 2018). Lastly, Nepali practitioners had expressed interest in a DBT-informed intervention, with members of the larger community also indicating they would be receptive to treatments drawing from various Eastern cultural traditions. Combined, these factors recommended development and implementation of a DBT-informed intervention.

The resulting intervention, Regulating Emotions through Adapted Dialectical Behavior Skills for Youth (READY-Nepal), is a manualized, emotion-focused skills training program designed to promote positive mental health and support resilient responding in trauma-exposed adolescents. (See Table 2 for an overview of the curriculum.) The program consists of 8 group sessions, each lasting approximately 50 minutes in length. It was provided twice-weekly for a total of five weeks, although alternative delivery formats are also possible. The modularized, emotion-focused intervention was informed by principles of DBT and was designed to both augment and generalize Nepali adolescents' emotion regulation abilities during stressful experiences. The intervention was developed from a prior, more intensive version of the intervention that was culturally adapted and piloted using community-based participatory methodology with a cohort of low-literacy women with histories of suicidal behaviors in Nepal (Ramaiya et al., 2017, 2018). The program is divided into 5 components, and includes both didactic and experiential instruction in skills related to mindfulness, stress tolerance, emotional awareness and regulation, and mastery of interpersonal relationships. All sessions begin with a group mindfulness exercise, followed by a behavioral chain analysis to identify target problem

behaviors appropriate for skills training. Skill-specific didactics and experiential activities for one of the three READY-Nepal modules (Mindfulness, Emotion Regulation, and Interpersonal Effectiveness) followed. Each session concluded with homework assignment and generalization strategies for skills learned during the session. The intervention was delivered in Nepali by two local research assistants with no prior mental health experience and a US doctoral student with one year of comprehensive DBT training. An experienced, US-based DBT clinician provided regular supervision. The intervention was delivered at no financial cost to participants.

Our primary research question concerned the efficacy of READY-Nepal in prevention of emotion regulation-related distress and related mental health symptoms. We predicted (**Hypothesis #1**) that adolescents in the intervention arm would demonstrate greater improvements on a broad range of outcome measures relative to a wait-list control arm. Based on prior findings from the only two trials for group interventions in LMICs (Bolton et al., 2007; Tol et al., 2008) in which females benefitted more from psychosocial interventions than males, our second research question concerned differential intervention effects based on gender. We predicted (**Hypothesis #2**) that females, relative to males, would be more engaged in the intervention and experience greater improvements on outcome measures.

All portions of the study were conducted in collaboration with Transcultural Psychosocial Organization (TPO)-Nepal, a mental health research-oriented organization based in Kathmandu. The study received approval by Duke University's Institutional Review Board(Pro#00071881) as well as the Nepal Health Research Council.

Methods

Setting

Nepal has a population of approximately 27 million, of which 90% live in rural areas and 25% subsist below the international poverty line (UNICEF, 2009). The poorest country in South Asia (World Bank, 2007), Nepal suffered a 10-year long civil war between the Communist Party of Nepal and government forces leading to deterioration of fragile socioeconomic and mental health infrastructures, which have since seen minimal lasting improvements. Government mental health resources are scarce, with virtually nonexistent access to formal mental healthcare in rural as well as many urban and peri-urban settings (Regmi, Pokharel, Ojha, Pradhan, & Chapagain, 2004). The overall ratio of psychological resources per capita remains almost negligible, with only six psychologists available per 100,000 persons (Devkota, 2011).

The specific study was conducted in Sankhu, a small population center in central Nepal that comprises approximately 2,400 people (Government of Nepal, 2015). On account of its location in the primary earthquake epicenter region in Kathmandu valley, the effects of the earthquakes were pronounced in the region. In Sankhu town center, located in close proximity to the second earthquake's epicenter, 45 people were killed and 1,200 homes destroyed (Barry, 2016). Schools were closed for approximately two months after the earthquake, and rebuilding remains an ongoing project nearly two years later. Organizations such as Change for Health Nepal and Youth Action Nepal have made efforts to remedy these health disparities through medical services and psychosocial counseling for individuals living in shelters (Change for Health Nepal, 2015); however, targeted mental health preventive services for individuals are minimal.

Design

A gender-stratified, quasi-experimental design was conducted targeting Nepali secondary school students. In order to reduce the potential for contamination effects among students (i.e.

diffusion of skills or related intervention content), participant groups were defined to match the school's existing classroom designations, further subdivided only by gender. Each resulting group was then assigned as a whole to either experimental or control arms. Outcome measures were taken on two occasions: the first one-week pre-intervention, and the second four weeks post-intervention.

Participants

Study participants ($N = 102$) were adolescents aged 13 to 17, attending one earthquake-affected secondary school in Sankhu identified through key informants at TPO-Nepal. Allocation to study arms followed a two-step procedure using purposive sampling. First, a pool of eligible classrooms ($N = 6$) was identified through collaboration with school administrators through use of an official class registry. Classrooms were eligible for participation if (1) students were between the ages of 13 and 17; and (2) students would not be preparing for a national secondary school examination at the time of intervention delivery. Next, whole classrooms were assigned to either intervention or control arms. Classrooms were eligible for enrollment in the intervention arm if they (1) had a free period during the allocated intervention time; and (2) had a relatively equal proportion of males and females. Eligible classrooms (n = 2) were then segregated by gender, leading to formation of four groups (n = 40 participants) in the experimental arm. All other classrooms (n = 4; 62 participants) were assigned to the wait-list arm, who received the intervention the following year.

Outcome Measures

Quantitative outcome measures were used to evaluate changes on a range of indicators, ranging from emotional and psychological difficulties, positive aspects of well-being, and levels of mental health symptomatology. All quantitative data was collected pre- and post-intervention

via a self-administered, tablet-based battery. This method was preferred over typical verbal administration due to the literacy level of participants, in addition to the need to maximize potential reductions in available time for participating students.

Primary outcome.

Emotion regulation. Changes in emotion regulation were assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS, a 36-item self-report scale, is designed to assess multiple domains of emotion regulation. In Nepal, the instrument has been adapted for the sample using a validated transcultural translation process (van Ommeren, 2012). Each item is scored on a four-point scale from 1 "almost never" to 5 "almost always," with higher scores indicating greater of emotion dysregulation. Examples of backtranslated items from the Nepali version include "In the last two weeks, when I was in emotional pain, I didn't know if I was sad, frightened, or angry" and "In the last two weeks, I knew exactly what feelings were happening in my heart-mind". Internal consistency of the full scale in this study was $\alpha = 0.77$.

Secondary outcomes.

Coping skills. Uptake of coping skills was assessed using a variant of the Dialectical Behavior Therapy Ways of Coping Checklist (DBT-WCCL): The DBT-WCCL is an adaptation of the Revised Ways of Coping Checklist (RWCCL; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985) that includes additional items intended to represent DBT-specific skills (Neacsiu, Rizvi, Vitaliano, Lynch, & Linehan, 2010). In Nepal, the instrument has been transculturally adapted and tested with a sample of suicidal and self-harming women in a rural district. The 18-item Nepali adapted version measures the frequency of DBT skills use over the previous two weeks. The Crohnbach's alpha for the DBT-WCCL in this study was 0.73.

Anxiety: Changes in adolescent anxiety symptoms were assessed using the Nepali version of the Beck Anxiety Inventory (BAI; Kohrt et al., 2013). The BAI, a 21-item instrument, has been clinically and culturally validated use in Nepal. Items are scored 0-3 with an instrument rage of 0 to 62. Based on clinical validation in Nepal, a score of 17 or higher indicates moderate anxiety with need for intervention. Crohnbach's alpha for the 21-item BAI was 0.90. A subset of six items from the original BAI were used in this study, based on items most frequently endorsed in a longitudinal study examining the mental health of Nepali child soldiers and other youth affected by conflict (Kohrt et al., 2008).

Child post-traumatic stress disorder (PTSD): PTSD symptoms were measured using the child version of the Posttraumatic Diagnostic Scale (Foa et al., 2001). The 17-item self-report measure correlates with PTSD diagnostic criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (APA, 2000). The sensitivity in Nepal = 0.68, specificity = 0.73, and clinical cutoff is ≥ 20 (Kohrt et al., 2011). The five items selected from this instrument are those demonstrating high discriminant validity: nightmares (CPSS 2), flashbacks (CPSS 3), traumatic amnesia (CPSS 8), feelings of a foreshortened future (CPSS 12) and easily irritated at small matters (CPSS 14). Crohnbach's alpha for the CPSS was 0.81.

Functional impairment: Changes in adolescent functional impairment were measured using the Nepali version of the Child Functioning Impairment Scale (CFI; Kohrt et al., 2008). The CFI is a 10-item scale assessing functional impairment in a number of domains (difficulties working in the field, completing household chores and schoolwork, bathing), with higher scores indicating greater functional difficulties. The CFI has been clinically and culturally validated for use in Nepal, with a Crohnbach's alpha for the Nepali version of 0.78.

Resilience: Changes in adolescent resilience were measured using items adapted from the Wagnild & Young (1993) Resilience Scale. This adapted scale, 7-item has been clinically and culturally validated for use in Nepal (Kohrt et al., 2016). Items assess levels of resilient behaviors across personal and social categories, and are scored from 0 "never" to 3 "every time" with an instrument rage of 0 to 62. All items demonstrate an association with depression and anxiety, and have an item-total correlation of greater than 0.4. Internal consistency of the total score was $\alpha = 0.77$ in the Nepali version.

Suicide and self-harm: Changes in suicidal ideation, suicide attempts and non-suicidal self-injury (NSSI) were assessed via a 4-item scale with "yes" and "no" response type options, in addition to daily diary cards completed by participating adolescents.

Data Collection

Three local research assistants and two US masters-level researchers who were not involved in service delivery were selected and received one week of quantitative and quantitative research training. It was not possible to blind assessors to treatment status, as they were required to visit the site to conduct both quantitative assessments and interviews. Data was collected between June to September, 2016.

Analyses

All statistical analyses were conducted using R version 3.1.3 (R Development Core Team, 2014). First, score distributions across all continuous dependent variables were examined for normality, with appropriate transformations made to normalize distributions with excessive skewness (> 2.0) or kurtosis (> 7.0). Independent-samples *t* tests were then used to compare completers vs. dropouts in addition to intervention vs. control participants. Baseline differences

in general characteristics and outcome measures were assessed via Wilcoxon rank sum test for continuous measures or Chi Square tests for categorical measures.

Because enrollment took place at the classroom level, with students nested within classroom, individual responses in these clusters are not independent and may lead to aggregation bias (homogeneity of students' responses within groups) and inflated Type 1 error. To accommodate for inherent nesting within the data structure, we used a two-level multilevel model (MLM) with time nested within individuals (Level 1) and individuals nested within classrooms (Level 2). MLM provides more precise models of individual patterns of growth over time, while accounting for nested data (Singer, 1998). This method enabled our assessment of within- and between-person changes over time while considering the effect of shared classroom variance. Conditions were then compared using a series of MLMs (with independent models run per outcome) with full information maximum likelihood estimation (FIML). By using FIML, MLM is able to estimate models for all participants regardless of missing data points, under the assumption that data are missing at random (Raudenbush & Bryk, 2002). Because of our interest in the differential impact of the intervention based on gender, gender was examined as a moderator in all models by including an interaction term between gender and arm.

Results

Description of Participants

Demographic and clinical characteristics and suicidal behaviors are summarized in Table 3. The total sample consisted of 102 participants (age 13 to 18), with an approximately even divide between males (49%) and females (51%). The majority of participants (71.9%) were members of the Newari ethnic group. At baseline, 29.2% of participants (n = 28) reported current

(i.e., over the prior two weeks) suicidal ideation. At baseline, 14.6% of participants (n = 14) reported any lifetime suicidal behavior (i.e., suicide attempts, non-suicidal self-injury episodes).

Preliminary Analyses

Data for coping skills use, anxiety, trauma, and functioning were positively skewed. Z scores for these outcome variables improved to acceptable normality parameters for following square root transformations. After transformation, there were between one to four baseline outliners for emotion regulation, functioning, and resilience, which were retained in the final analyses. There were comparable percentages of missing students at baseline and follow-up, and no significant baseline differences on any outcome variable.

Overall attendance in the 8-session program was high (M = 6.7), with females attending a higher mean number of sessions (7.1) relative to males (6.3).

Multilevel Modeling Analyses

Table 4 presents results from the multilevel models, represented using fixed effects (including estimates and standard errors). There were no main effects of time, arm, or time*arm interactions on the majority of primary and secondary outcome variables. There were significant main effects of time and arm for functioning in a direction contrary to our initial predictions (i.e., relative to the intervention arm, participants in the control group showed greater mean decreases in functional impairment). Statistically significant moderation by gender was present for anxiety and trauma, with females reporting greater reductions in symptoms relative to males. (See Figure 2.)

Discussion

The current study used a quasi-experimental design to investigate the preliminary effects of an 8-session, skills-based emotion regulation curriculum in adolescents in a post-disaster

Nepali setting. Unlike earlier promising prevention and treatment studies in secondary schools in both HICs (e.g., Atkinson & Wade, 2015; Kuyken et al., 2013; Racs et al., 2014; Sibinga et al., 2013) and LMICs (e.g., Tol et al., 2008; Jordans et al., 2008), we found no improvements in either primary (emotion regulation) or secondary outcome variables (coping skills, anxiety, trauma, functioning, resilience) at follow-up (four weeks). Contrary to study hypotheses, we found that participants in the control arm reported significantly greater improvements in functioning over time relative to the intervention group. However, the time*arm interaction was not significant. We also found evidence of moderation by gender for anxiety and trauma, with females reporting greater reductions in symptoms relative to males.

Given rising interest in development and dissemination of mental health prevention interventions globally, our results are worthy of close consideration. One explanation for the lack of positive findings is the presence of floor effects, which are common in universal prevention programs given the relative health of the sample compared to a clinical group. These may result in an increase in the frequency of false negatives (Type II error). However, given the higher proportion of mental health symptomatology in our sample relative to other similar-age samples (e.g., Johnson et al., 2016; Raes et al., 2014), these basement effects are unlikely to explain the current findings.

Questions regarding optimal dosage of school-based interventions in LMIC populations remain to be explored. In one systematic review of school-based mental health programs in LMICs (Fazel et al., 2016), the average length of sessions ranged from eight to 20 sessions, with a mean of 14 sessions. This average is nearly twice the number of sessions included in the current READY-Nepal program, leading low dosage to be a potential explanatory variable for our null findings. Future studies might formally investigate optimal session number and length,

or whether alternative strategies to increase the dose of the intervention (e.g., short daily classroom practices, extending curriculum length or teaching additional modules over subsequent year levels) could lead to the detection of positive results.

Our selection criteria may also explain the absence of positive findings. Of existing empirically supported, school-based interventions in LMICs, half have utilized targeted screening to only enroll select students (e.g., those with demonstrated mental health problems, risk factors for mental illness, and/or current symptoms of PTSD) (Fazel et al., 2016). In contrast, only 38% of LMIC studies adopted a "universal" approach like ours by selecting whole classes, with half of these studies (n = 4) reporting mixed or null findings. Further exploratory analyses that aim to identify sub-groups or sub-populations of students that benefitted from the READY-Nepal intervention is thus warranted, in order to identify individuals that may derive maximal benefit from the intervention.

Another explanation for the lack of detected effect is the unique intervention content in the READY-Nepal program. A number (n = 6) of trials in LMICs, and an even larger number in HICs, have utilized a health promoting schools (HPS) model by which socio-emotional learning is embedded into the school's existing health education curriculum and is taught at the whole-school level. Although the modular READY-Nepal curriculum has the potential to be integrated using a similar model, the current trial was delivered as an adjunctive intervention. Further, most HPS intervention content relies on use of cognitive behavioral, creative arts, or relaxation techniques. It may thus be possible that an emotion-focused intervention like READY-Nepal are likely to be targeting unique mechanisms (e.g., emotion regulation) that have yet to be empirically supported in this population. Although emotion regulation interventions have demonstrated promising success in adult clinical populations in Nepal (e.g., Ramaiya et al.,

2018), the mechanisms of action in adolescent Nepali populations may be distinct. Although other skills-based emotion regulation interventions have been successfully implemented in both adult and adolescent populations in HICs, no model of emotion regulation in youth populations currently exists that describes the developmental trajectory of its various components in the presence and absence of intervention. In addition, no model of emotion regulation in youth has specifically accounted for salient cultural factors (e.g., individualist and collectivist differences in the interpretation, presentation and experience of mental illness, acculturative stress, somatization, and stigma, and among a host of others) that may influence the generation and maintenance of adaptive and maladaptive emotion regulation. Until these pathways are clarified (and resulting intervention targets identified), program developers will continue to "fly blind" in their attempts to implement theoretical models with potential limited applicability in LMIC populations.

Despite the lack of anticipated findings, a number of strengths accompanied this study. The first included recruitment of a comparatively large sample relative to other school-based trials in LMICs. In addition, to the authors' knowledge, ours is the first study to examine the psychological effects of an emotion regulation intervention for adolescents in Asia. The cultural adaptation, simplification and manualization of didactic content for lay providers also enhance its dissemination and implementation potential in other resource-strained contexts in Asian settings. Its scalable nature is one key component broader global mental health agenda emphasizing delivery of culturally sensitive, effective, and appropriate care for vulnerable populations.

A number of limitations also exist. One key limitation is the use of a non-randomized control group, which has the potential to result in lack of baseline equivalence between the

intervention and control arms on a number of variables. The non-randomized, pilot nature of this study was therefore not powered for inference testing. Our two-measurement, pre-post design also precluded any assessment of the durability of effects beyond four-weeks post-intervention. These effects may be crucial to consider in the context of a prevention intervention like READY-Nepal, where longitudinal data may be necessary to confirm the presence of positive effects. Lastly, the use of culturally modified, comparatively brief scales further compromises the strength of any potential inferences and limits our ability to compare findings with those from other trials in LMICs. Future testing with more rigorous experimental control and improved internal validity is therefore warranted to corroborate (or nullify) current findings.

Conclusion

Regulating Emotions through Adapted Dialectical Behavior Skills for Youth (READY-Nepal) is a brief, school-based intervention targeting broad prevention of mental health symptoms and increases in positive mental health among disaster-exposed youth in Nepal. In a quasi-experimental trial of READY-Nepal, no differences by arm were found in either primary or secondary outcomes at four-week follow-up, with the exception of functioning (with control participants reporting greater improvement than intervention participants). Across arms, females reported greater reductions in anxiety and trauma symptoms relative to males. Further research, including investigation of optimal dosage, delivery formats, and cultural models of emotion regulation is necessary to explore the potential of school-based emotion regulation interventions in Nepal and other LMICs.

References

American Psychiatric Association. (2000). *Diagnostic criteria from DSM-IV-TR*. American Psychiatric Association.

Atkinson, M., & Wade, T. (2015). Mindfulness-based prevention for eating disorders: a school-based cluster randomised controlled pilot study. *International Journal of Eating Disorders*, 48(7), 1024-1037

Attanayake, V., McKay, R., Joffres, M., Singh, S., Burkle Jr, F., & Mills, E. (2009). Prevalence of mental disorders among children exposed to war: a systematic review of 7,920 children. *Medicine Conflict and Survival*, *25*(1), 4-19.

Bolton, P., Bass, J., Betancourt, T., Speelman, L., Ony- ango, G., Clougherty, K.F., Neugebauer, R., Murray, L., & Verdeli, H. (2007). Interventions for depression symptoms among a adolescent survivors of war and displacement in northern Uganda. *Journal of the American Medical Association*, 298, 519–527.

Change for Health Nepal (2015). Free health and motivational camp organized in Sankhu. Retrieved 11 March 2016 from http://www.cfhnepal.org/free-health-and motivational-camp-organized-in-sankhu/.

Fazel, M., Patel, V., Thomas, S., & Tol, W. (2014). Mental health interventions in schools in low-income and middle-income countries. *The Lancet Psychiatry*, *1*(5), 388-398.

Government of Nepal. (2015). Development Statistics of Nepal, 2014. Kathmandu, Nepal:

Government of Nepal.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of psychopathology and behavioral assessment*, *26*(1), 41-54.

Hayes, S. C., Villatte, M., Levin, M., & Hildebrandt, M. (2011). Open, aware, and active: Contextual approaches as an emerging trend in the behavioral and cognitive therapies. *Annual Review of Clinical Psychology*, *7*, 141-168.

Kohrt, B. A., Kunz, R. D., & Koirala, N. R. (2007). Validation of the Nepali version of beck anxiety inventory. *Journal of Institute of Medicine*, *26*(3).

Kohrt, B. A., Jordans, M. J., Tol, W. A., Speckman, R. A., Maharjan, S. M., Worthman, C. M., & Komproe, I. H. (2008). Comparison of mental health between former child soldiers and children never conscripted by armed groups in Nepal. *Jama*, *300*(6), 691-702.

Kohrt, B. A., Jordans, M. J., Tol, W. A., Luitel, N. P., Maharjan, S. M., & Upadhaya, N. (2011). Validation of cross-cultural child mental health and psychosocial research instruments: adapting the Depression Self-Rating Scale and Child PTSD Symptom Scale in Nepal. *BMC Psychiatry*, *11*(1), 1.

Kohrt, B. A., Worthman, C. M., Adhikari, R. P., Luitel, N. P., Arevalo, J. M., Ma, J., ... & Cole, S. W. (2016). Psychological resilience and the gene regulatory impact of posttraumatic stress in Nepali child soldiers. *Proceedings of the National Academy of Sciences*, *113*(29), 8156-8161.

Kuyken, W., Watkins, E., Holden, E., White, K., Taylor, R., Byford, S., ... Dalgleish, T. (2010).

How does mindfulness-based cognitive therapy work? Behaviour Research and Therapy, 48, 1105e1112.

Linehan, M. (1993a). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford Press.

Linehan, M. (1993b). *Skills training manual for treating borderline personality disorder*. New York: Guilford Press.

Linehan, M. (2014). *Dialectical behavior therapy skills training manual*. New York: Guilford Press.

Luitel, N. P., Kene, J., Jordans, M., Kohrt, B., & Tol, W. (2016). Mental health problems in the aftermath of earthquakes in Nepal. *European Psychiatry*, (33), S194-S195.

Neacsiu, A. D., Rizvi, S. L., & Linehan, M. M. (2010). Dialectical behavior therapy skills use as a mediator and outcome of treatment for borderline personality disorder. *Behaviour Research and Therapy*, *48*(9), 832-839.

Neacsiu, A. D., Eberle, J. W., Kramer, R., Wiesmann, T., & Linehan, M. M. (2014). Dialectical behavior therapy skills for transdiagnostic emotion dysregulation: A pilot randomized controlled trial. *Behaviour Research and Therapy*, *59*, 40-51.

Neupane, S. P. (2015). Immediate lessons from the Nepal earthquake. *The Lancet*, *385*(9982), 2041-2042.

Patel, V., Araya, R., Chatterjee, S., Chisholm, D., Cohen, A., De Silva, M., Hosman, C., McGuire, H., Rojas, G., & Van Ommeren, M. (2007). Treatment and prevention of mental disorders in low-income and middle-income countries. Lancet, 370, 991–1005.

Patel, V., Flisher, A. J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: a global public-health challenge. *The Lancet*, *369*(9569), 1302-1313.

Peltonen K, Qouta S, El Sarraj E, Punamaki RL. Effectiveness of school- based intervention in enhancing mental health and social functioning among war-affected children. *Traumatology* 2012; 18: 37–46.

Preacher, K., & Hayes, A. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*.

R Development Core Team (2014). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.

Raes, F., Griffith, J., Van der Gucht, K., & Williams, J. (2014). School-based prevention and reduction of depression in adolescents: a cluster-randomized trial of a mindfulness group program. *Mindfulness*, 5(5), 477-486.

Raudenbush, S. W., & Bryk, A. S. (2002). Hierarchical linear models: Applications and data analysis methods (2nd ed.). Newbury Park, CA: Sage.

Ramaiya, M. K., Fiorillo, D., Regmi, U., Robins, C. J., & Kohrt, B. A. (2017). A cultural adaptation of dialectical behavior therapy in Nepal. *Cognitive & Behavioral Practice*, *24*(4), 428-444.

Ramaiya, M. K., McLean, C., Regmi, U., Fiorillo, D., Robins, C. J., & Kohrt, B. A. (2018). A dialectical behavior therapy program for suicidal ideation and non-suicidal self-injury in rural Nepal: A single case experimental design series. *Journal of Clinical Psychology*. In press.

Regmi, S.K., Pokharel, A., Ojha, S.P., Pradhan, S.N., & Chapagain, G. (2004). Nepal mental health profile. International Review of Psychiatry, 16, 142–149.

Robins, C. J., & Chapman, A. L. (2004). Dialectical behavior therapy: Current status, recent developments, and future directions. *Journal of Personality Disorders*, *18*(1), 73-89.

Sibinga, E., Perry-Parish, C., Chung, S., Johnson, S., Smith, M., & Ellen, J. (2013). School-based

mindfulness instruction for urban male youth: a small random- ized controlled trial. *Preventive Medicine*, 57, 799-801.

Singer, J. D. (1998). Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. *Journal of Educational and Behavioral Statistics*, 23, 323–355.

Sreeramareddy, C.T., Shankar, P.R., Binu, V.S., Mukhopadhyay, C., Ray, B., & Menezes, R.G. (2007). Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. *BMC Medical Education, 7*, 26.

Stichick, T. (2001). The psychosocial impact of armed conflict on children. Rethinking traditional paradigms in research and intervention. *Child and Adolescent Psychiatric Clinics of North America*, 10, 797–814.

Tol, W.A., Komproe, I.H., Susanty, D., Jordans, M.J.D., & de Jong, J.T.V.M. (2008). School-based mental health intervention for children affected by political violence in Indonesia: A cluster randomized trial. Journal of the American Medical Association, 300, 655–662.

Van Ommeren, M., Sharma, B., Thapa, S., Makaju, R., Prasain, D., Bhattarai, R., & de Jong, J. (1999). Preparing instruments for transcultural research: use of the translation monitoring form with Nepali-speaking Bhutanese refugees. *Transcultural Psychiatry*, *36*(3), 285-301.

Vitaliano, P. P., Russo, J., Carr, J. E., Maiuro, R. D., & Becker, J. (1985). The ways of coping checklist: Revision and psychometric properties. *Multivariate Behavioral Research*, *20*(1), 3-26.

Wagnild, G., & Young, H. (1993). Development and psychometric. *Journal of Nursing Measurement*, *1*(2), 165-178.

World Bank. (2007). Interim strategy note for Nepal. January 22. Nepal Country Management

Unit, South Asia Region.

World Health Organization. (2013). Mental health action plan 2013-2020.

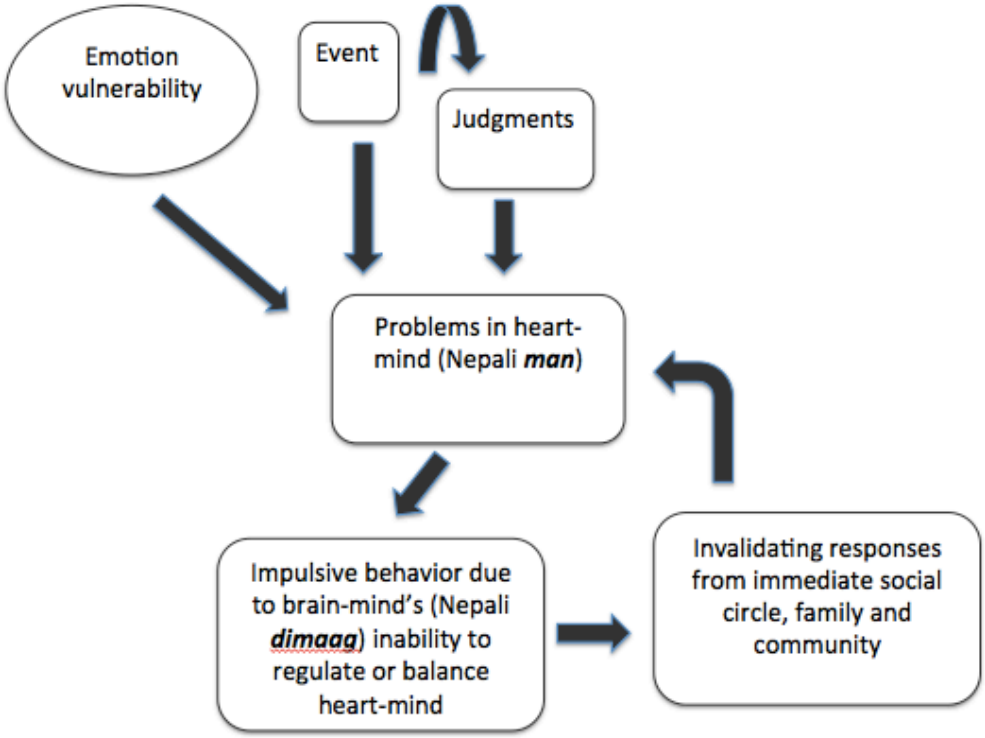


Figure 1. Nepali Transactional Model of Emotion Dysregulation. This theoretical model synthesizes data on processes generating and maintaining emotion dysregulation developed in high-income settings (e.g., Linehan, 1993a) with Nepali ethnopsychological adaptations. According to Nepali ethnopsychology, the physical body is divided into a number of components, including the heart-mind (Nepali *man*, the location of affect, memory, and uniqueness) and brain-mind (Nepali *dimaag*, the rational that simultaneously governs normative social behavior). According to the model, external or internal events are thought to trigger emotional heaviness (e.g., stress) in the *man*. Heart-mind problems result in socially inappropriate behaviors, which are then socially invalidated. This feedback loop, when coupled with an early predisposition (genetic, environmental and developmental) for emotional sensitivity and reactivity, results in a transacting model of pervasive dysregulation. If left untreated, more severe externalizing psychopathology (e.g., suicide attempts, substance use disorders) are theorized to result.

Table 2.
Regulating Emotions through Adapted Dialectical Behavior Skills for Youth in Nepal (READY-Nepal) Curriculum

Time	Topics Covered
Session One	*Diary card* *Program Orientation* *Group Guidelines* *Transactional Model of Stress* *Mindfulness** *Defining Mindfulness*
Session Two	*Mindfulness** *"What" skills* *"How" skills*
Session Three	*Emotion Regulation** *Awareness of emotions*
Session Four	*Emotion Regulation** *Changing emotions (crisis survival skills)*
Session Five	*Emotion Regulation** *Changing emotions (opposite action)*
Session Six	*Interpersonal Effectiveness** *Balancing priorities in relationships* *Relationship effectiveness*
Session Seven	*Interpersonal Effectiveness** *Objective effectiveness*
Session Eight	*Program Recap & Review* *Closing*

*****Module derived from second-edition Skills Training Manual (Linehan, 2014)

Table 3.
Baseline Characteristics of Nepali Secondary School Students (*N* = 102)

	Participants
Age, Mean (SD, Range)	14.3 (1.3, 13-18)
Female, No. (%)	49 (51)
Caste, No. (%)	
High-caste Nepali (Brahmin, Chhetri)	16 (16.7)
Low-caste Nepali (Dalit)	4 (4.2)
Ethnic groups	69 (71.9)
Other	7 (7.3)
Current Psychopathology	
Anxiety score, mean (SD)	5.3 (2.9)
Post-traumatic stress disorder score,	5.3 (3.0)
mean (SD)	10 (100)
Current Suicidal Ideation, n (%)	28 (29.2)
Lifetime Suicidal Behavior, n (%)	14 (14.6)
Sessions Attended, mean (SD)	
Females	7.1 (1.2)
Males	6.3 (1.4)

Table 4.
Fixed Effects from MLM Analyses Across Primary and Secondary Outcomes among Nepali Secondary School Students (*N* = 102)

	Emotion Regulation: DERS Estimate (SE)	Coping Skills Use: DBT-WCCL Estimate (SE)	Dysfunctional Coping: DBT-WCCL Estimate (SE)	Anxiety: BAI Estimate (SE)	Trauma: CPSS Estimate (SE)	Functioning: CFI Estimate (SE)	Resilience: RES Estimate (SE)
Intercept	31.08 (1.02)	23.95 (1.11)	3.75 (0.27)	5.54 (0.42)	5.49 (0.37)	21.10 (0.72)	10.04 (0.51)
Time	-1.31 (0.71)	-0.76 (1.09)	-0.06 (0.27)	-0.04 (0.42)	-0.37 (0.39)	-2.17 (0.58)***	0.11 (0.62)
Condition (Intervention)	-0.48 (1.32)	-0.30 (1.72)	-0.25 (0.41)	-0.47 (0.61)	-0.38 (0.57)	-2.48 (1.04)*	0.29 (0.80)
Time* Condition	0.76 (1.09)	0.51 (1.68)	-0.20 (0.42)	0.38 (0.65)	-0.19 (0.60)	1.60 (0.89)	-0.52 (0.95)
Gender (Female)	1.65 (1.13)	1.19 (1.51)	0.41 (0.36)	1.00 (0.50)*	1.09 (0.48)*	1.21 (0.91)	0.95 (0.64)

Note. DERS = Difficulties in Emotion Regulation Scale; DBT-WCCL = DBT Ways of Coping Checklist; BAI = Beck Anxiety Inventory; CPSS = Child Post-Traumatic Stress Disorder Scale; CFI = Child Functioning Impairment Scale; RES = Resilience Scale

*** *<.001*

* *< .05*

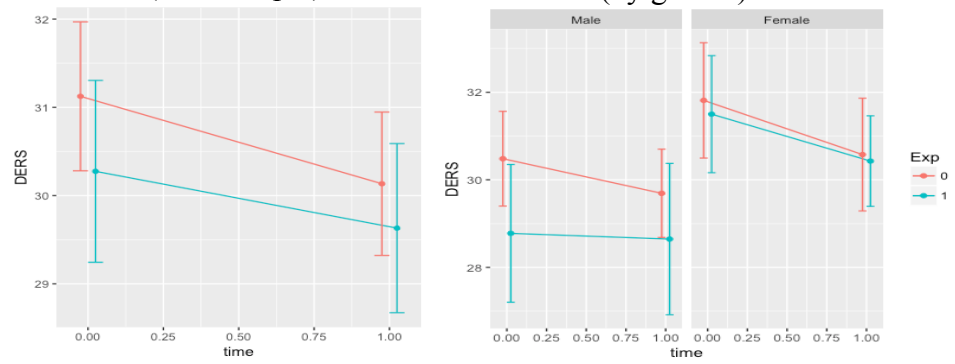
Table 5.
Endorsement of Suicidal Ideation by Time and Condition (N = 102)

	Baseline (N)	Follow-Up (N)
Intervention	13	10
Female	9	7
Male	4	3
Control	15	15
Female	7	10
Male	8	5

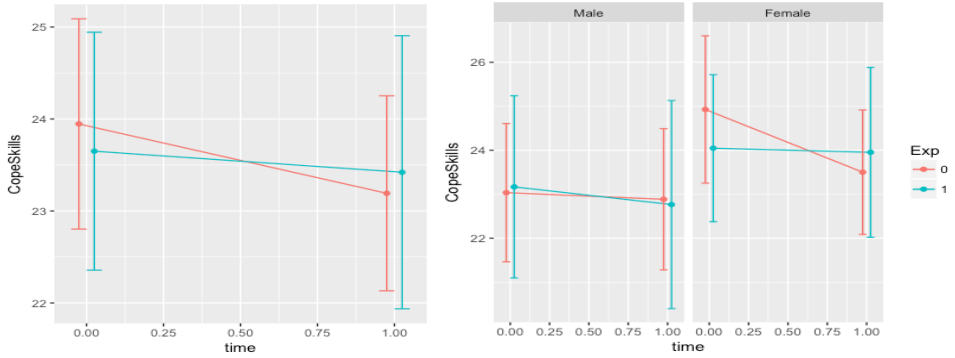
Pre-Post Changes (total sample)

Pre-Post Changes (by gender)

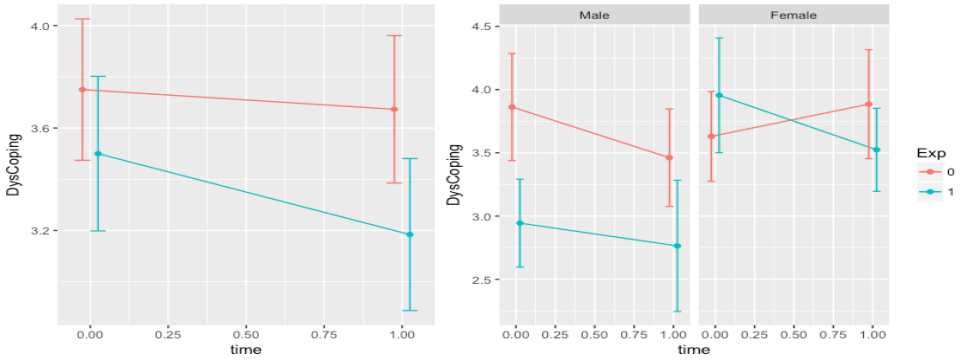
Emotion Regulation (DERS)



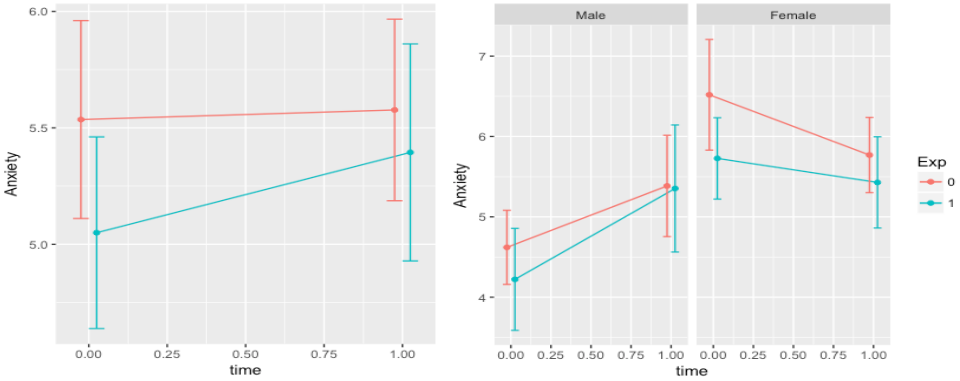
Coping Skills (DBT-WCCL)



Dysfunctional Coping (DBT-WCCL)



Anxiety (BAI)



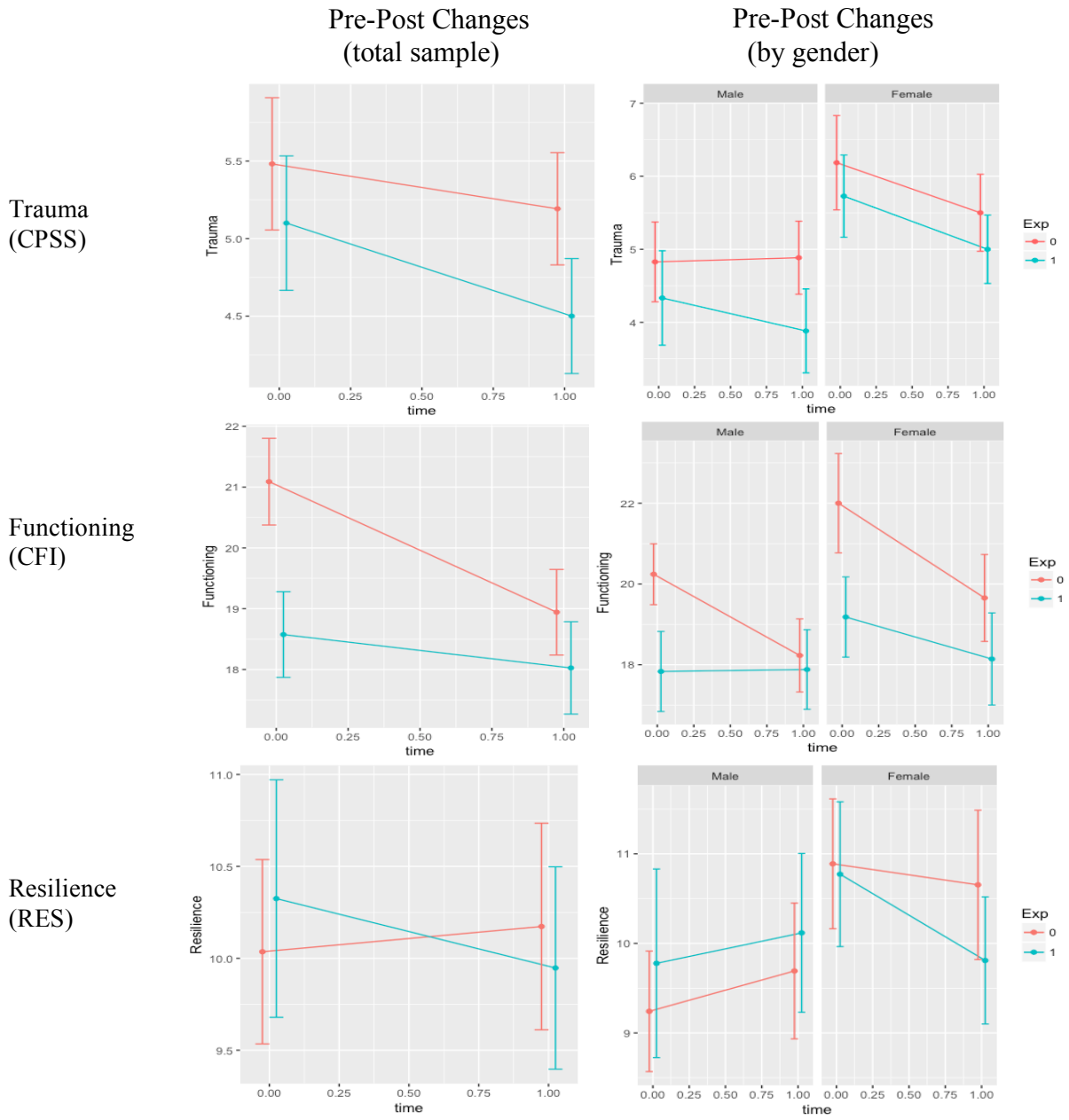


Figure 2. Changes in pre- and post- intervention scores by outcome measure. The first column represents full-sample changes by arm, while the second column segregates pre- and post-intervention differences by gender. Blue and red lines represent the intervention and control arms, respectively.

Note. 0 = control arm; 1= intervention arm.

DERS = Difficulties in Emotion Regulation Scale; DBT-WCCL = DBT Ways of Coping Checklist; BAI = Beck Anxiety Inventory; CPSS = Child Post-Traumatic Stress Disorder Scale; CFI = Child Functioning Impairment Scale; RES = Resilience Scale