Promoting Healthy Developmental Pathways for Children In and Out of Situations of Extreme Adversity

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ABSTRACT

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In three parts, this dissertation seeks to clarify constructs used in contemporary and emerging models of child resilience, examine the predictive capacity of these models, and delineate key steps towards improving and refining models useful to mental health and psychosocial support program and policy initiatives in humanitarian settings. Data collected for this research was part of an inter-agency evaluation of Child Friendly Spaces in Nepal following the 2015 earthquake. Findings from these studies call for future research directed towards the development of more rigorous and equitable indicators used to evaluate mental health and psychosocial support programs that allow for a longer tracing of healthy developmental trajectories for children affected by situations of extreme adversity.

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Dedication

To my partner, Jason Viseltear

For all the times I asked for a few minutes

And you gave a few hours,

Your persistent patience allowed for my process.

I thank you from the deepest depths of my being.

Introduction

The disruption of community-based systems of protection, care and support by armed conflict or natural disaster can have lasting, devastating consequences for children. Mental health and psychosocial support (MHPSS) practitioners are charged with attending to these effects and are increasingly using 'resilience-based approaches' to promote psychosocial wellbeing well beyond the acute response phase to enable children to adjust and navigate effectively to achieve developmental milestones [1]. While the central premise of resilience remains the notion of overcoming rather than succumbing to the effects of adversity [2], the core components and active mechanisms by which resilience operates have been the center of practical debate for decades. The widespread conceptual ambiguity and prolific use of the term across humanitarian sectors frequently contributes to challenges in its operationalization and measurement that would enable a longer-term vision of program effects that support healthy developmental pathways of children faced with situations of extreme adversity.

Early efforts to understand resilience examined the child's functionality in relation to exposure to risk factors [3]. In other words, researchers wanted to know why, when faced with the same source of stress, would some children exhibit maladaptive stress responses and others would respond and rebound to what could only be described as thriving in the midst of adversity. This early research focused on the attributes of child as well as the characteristics and quantity of risk exposure required to initiate resilient pathways of response and recovery [3]. A cumulative risk index was frequently used by practitioners, in part due to its well-established dose-response relationship to the expression of negative outcomes, such as psychological distress or conduct problems [4]. However, challenges persist in the use of cumulative risk in resilience models due

to issues of temporality, the poor articulation of mediation and moderating effects, and unstandardized methods for managing cut-offs in non-binary variables [4].

Latter waves of resilience research drew upon the ecological model developed by Bronfenbrenner to gain insight into the influences of the child's environment that support the child in achieving developmental milestones [5, 6]. Research delved heavily into examining factors that were promotive or protective of the child's social and emotional wellbeing. Promotive factors were thought to work in opposition to risk to drive positive health and wellbeing outcomes in children while protective factors moderate or reduce the effects of risk, often associated with diminished psychological symptoms [7-9]. Strong family relationships, positive peer relationships, social support, and several other factors have all been studied and noted for their protective or promotive effects on children's mental health and psychosocial well-being [11-17]. These contributing factors are often highly relevant for external intervention providing strong support in favor of addressing the needs of children at targeted layers of the socio-ecological environment [10].

Recent shifts in discourse have moved away from deficit-focused resilience models towards a more comprehensive understanding of what it means for a child to be *doing well.* Newer models emphasize the role of adaptive capacities and assets as primary outcomes for children – rather than previously hypothesized mediators or moderators. These emerging resilience models encourage researchers to take on a more comprehensive definition that examines local mechanisms and pathways of resource acquisition at various socio-ecological levels that are contextually and culturally specific [18-20]. The field of resilience has decidedly shifted towards a more nuanced understanding of the dynamic processes that facilitate the identification, navigation and attainment of resources required for lasting recovery from

adversity [21]. Our task as researchers is to unpack the complex patterns and differential access to resources that would enable practitioners to more holistically and equitably address the needs of children and families in emergencies.

While the concept of resilience remains under scrutiny for its usefulness to policy and practice, an opportunity exists to demonstrate its value to the broader field of MHPSS and other child-focused programming initiatives in humanitarian settings. This dissertation seeks to examine the usefulness of four frequently used models of child resilience for MHPSS practice and propose an innovation to strengthen a newly emerging model in the hopes of promoting lasting healthier developmental pathways for all children in emergencies. Using baseline data collected as part of a broader evaluation of Child Friendly Spaces in Nepal following the 2015 earthquake, this dissertation presents three papers that contribute to the evidence and support practitioners in the measurement of MHPS outcomes to ensure high-quality and high-impact programs are available and accessible to children.

Given the shortage of evidence related to the validity and reliability of psychosocial measures used in humanitarian settings, paper one examines the factor structure of a frequently used tool to measure hope [22]. This analysis lays the foundation for paper two which examines the usefulness of existing and emerging models of child resilience to MHPSS practice. The third paper uses an exploratory spatial analysis to propose an innovation that will strengthen future models of child resilience used in humanitarian settings. Paper three presents an argument for leveraging existing nationally-representative data sources to provide a more robust contextual analysis that can be integrated into rapid assessments and used to strengthen core indicators used in evaluative models of child resilience.

References

1. Ager A, Annan, J., & Panter-Brick, C.: **Resilience: From conceptualization to effective intervention.** In *Policy Brief for IRC Strategic Planning Meeting, May 6, 2013*; 2013.

2. Rutter M: **Psychosocial Resilience and Protective Mechanisms.** *American Journal of Orthopsychiatry* 1987, **57:**316-331.

3. Masten A: **Resilience in children threatened by extreme adversity: Frameworks for research, practice, and translational synergy.** *Development and Psychopathology* 2011, **23:**493-506.

4. Evans G, Li, D., & Sepanski Whipple, S.: **Cumulative Risk and Child Development.** *Psychological Bulletin* 2013, **139:**1342-1396.

5. Bronfenbrenner U: **Ecological models of human development. .** In *In International Encyclopedia of Education*, vol. 3, 2nd edition. Oxford: Elsevier; 1994.

6. Masten A: **Global perspectives on resilience in children and youth.** *Child Development* 2014, **85:**6-20.

7. Tol W, Song, S., & Jordans, M.: **Annual Research Review: Resilience and mental health in children and adolescents living in areas of armed conflict – a systematic review of findings in low- and middle-income countries.** *Journal of Child Psychology and Psychiatry* 2013, **54:**445–460.

8. Patel V, & Goodman, A.: **Researching protective and promotive factors in mental health.** *International Journal of Epidemiology* 2007, **36:**703-707.

9. Sameroff A: **Developmental systems and psychopathology.** *Development and Psychopathology* 2000, **12:**297-312.

10. Tol W, Komproe, I., Jordans, M., Gross, A., Susanty, D., Macy, R., & De Jong, J.: **Mediators and Moderators of a Psychosocial Intervention for Children Affected by Political Violence.** *Journal of Consulting and Clinical Psychology* 2010, **78:**818-828.

11. Loughry M, Ager A, Flouri E, Khamis V, Afana AH, Qouta S: **The impact of structured activities among Palestinian children in a time of conflict.** *Journal of Child Psychology and Psychiatry and Allied Disciplines* 2006, **47:**1211-1218.

12. Betancourt TS, McBain R, Newnham EA, Akinsulure-Smith AM, Brennan RT, Weisz JR, Hansen NB: **A behavioral intervention for war-affected youth in Sierra Leone: A randomized controlled trial.** *Journal of the American Academy of Child and Adolescent Psychiatry* 2014, **53:**1288-1297.

13. Diab M, Punamäki RL, Palosaari E, Qouta SR: **Can Psychosocial Intervention Improve Peer and Sibling Relations Among War-affected Children? Impact and Mediating Analyses in a Randomized Controlled Trial.** *Social Development* 2014, **23:**215-231.

14. Tol WA, Komproe IH, Jordans MJ, Ndayisaba A, Ntamutumba P, Sipsma H, Smallegange ES, Macy RD, de Jong JT: **School-based mental health intervention for children in war-affected Burundi: a cluster randomized trial.** *BMC Med* 2014, **12:**56.

15. Boyden J, & Mann, G.: **Children's Risk, Resilience, and Coping in Extreme Situations.** In *Handbook for Working with Children and Youth: Pathways to Resilience Across Cultures and Contexts* (Ungar M ed. pp. 3-26. Thousand Oaks, London, New Delhi: Sage Publications, Inc.; 2005:3-26.

16. Quota S, Punamaki, R., El Sarraj, E.: **Child development and family mental health in war and military violence: the Palestinian experience.** *International Journal of Behavioral Development* 2008, **32:**310-321.

17. Reed RV, Fazel M, Jones L, Panter-Brick C, Stein A: **Mental health of displaced and refugee children resettled in low-income and middle-income countries: Risk and protective factors.** *The Lancet* 2012, **379:**250-265.

18. Masten A, & Narayan, A.: **Child development in the context of disaster, war, and terrorism: Pathways of risk and resilience.** *Annual Review of Psychology* 2012**:**227-257.

19. Ungar M: **The social ecology of resilience: Addressing contextual and cultural ambiguity of a nascent construct.** *American Journal of Orthopsychiatry* 2011, **81**.

20. Ungar M, Ghazinour M, Richter J: **Annual research review: What is resilience within the social ecology of human development?** *Journal of Child Psychology and Psychiatry and Allied Disciplines* 2013, **54:**348-366.

21. Ager A, Metzler J: **Where there is no intervention: Insights into processes of resilience supporting war-affected children.** *Peace and Conflict: Journal of Peace Psychology* 2017, **23**.

22. Ager A, Robinson, S., & Metzler, J.: **Methodologies and Tools for Measuring Mental Health and Psychosocial Wellbeing of Children in Humanitarian Contexts: Report of a Mapping Exercise for the Child Protection Working Group (CPWG) and Mental Health & Psychosocial Support (MHPSS) Reference Group.** New York: Columbia University, Columbia Group for Children in Adversity and Child Protection in Crisis (CPC) Network.; 2014.

Paper 1: Psychometric Properties of The Nepali Children's Hope Scale Used in Post-Earthquake Humanitarian Response

Abstract

Hope is frequently used to describe positive wellbeing as well as a protective mechanism of resilient outcomes in children. The present study examined the psychometric properties of the Children's Hope Scale using data collected from 607 children aged 9 to 17 years following the 2015 Nepal earthquake. Confirmatory factor analysis (CFA) was used to examine the previously theorized measurement models of unidimensional and multi-dimensional hope. Results support a two-factor structure of hope, in which *agency* and *pathways* factors covary. Findings suggest the CHS provides a reliable and valid basis for rapid assessment of children's hopefulness in the context of humanitarian emergencies. Further studies should include a more comprehensive understanding of construct validity of the CHS and measurement invariance across time and subgroups.

Key words: Children's Hope Scale, psychometrics, children, resilience, natural disasters

Introduction

Disasters profoundly affect the social and communal mechanisms of support foundational to the development, care and protection of children. Trauma and the effects of forced displacement as a result of natural disasters can have lasting implications for children far beyond the acute response phase of humanitarian action. Current inter-agency guidance recommends the mobilization of multi-layered mental health and psychosocial support programming soon after the onset of emergency that incorporates basic needs, community and family supports, non-specialized and specialized supports [1]. Increasingly, humanitarian practitioners are using 'resilience-based approaches' in psychosocial programming as a way of supporting and promoting lasting positive outcomes for children [2].

Recent attempts to measure resilience in psychosocial interventions focus on the adaptive capacities of the child that mitigate the effects of adverse events and facilitate the identification, navigation and attainment of resources [3]. However, the operationalization of resilience in evaluations of psychosocial interventions in emergencies remains challenging. Measurement of resilience often includes some assessment of multi-level risk and factors that contribute to either a lessening of symptoms or an enhancement of wellbeing [4]. Promotive factors work in opposition to risk to drive positive health and wellbeing outcomes in children while protective factors moderate or reduce the effects of risk, often associated with reduced or sustained psychological symptoms or improved wellbeing outcomes [5, 6]. The inclusion of these contributing factors within broader child resilience frameworks provides clear guidance for practitioners to support more targeted activities for children.

Hope is frequently referenced as a contributing factor that mediates or moderates the risk-adaptation pathway [7, 8]. Recently, hope is being studied more and more as a primary outcome

and positive aspect of wellbeing [9-11]. Much of the literature describes the cultural and contextual specificity of the construction of hope that gives meaning to one's experiences and propagates the belief that adversity can be overcome [12, 13]. Hope provides a useful frame for the child's capacity to engage in things relevant to a future state, rather than be dominated by perceptions in current circumstances.

The Children's Hope Scale (CHS), developed by Snyder and colleagues, is a widely used tool available in multiple languages containing six items measuring a child's self-perception and level of belief about personal goal-attainment, with higher sum scores indicative of more hope and goal-directed behavior [14]. Snyder and colleagues hypothesized that hope was comprised of two core components, *pathways* and *agency* [14]. The *pathways* component encompasses both evaluation of feasible routes towards the child's goals and the agility required to navigate these various routes efficiently towards the achievement of specified goals [14, 15]. *Agency*, on the other hand, relies on the belief in one's own appraisal of capacity to navigate these routes towards achieving goals [14, 15].

The CHS has been adapted for use in multiple countries and contexts including Portugal, South Africa, Nepal, Burundi, China, and amongst Native American children in the Midwest [7, 9, 16-19]. Data collected from adolescents in the Western Cape Region of South Africa supported a unidimensional factor model of hope with the error terms of items 1 and 3 as well as items 4 and 6 allowed to covary ($\chi 2$ (7) = 35.692, $p<0.001$; CFI=0.984; RMSEA=0.063; SRMR=0.023) [17]. The 2-factor structure hypothesized by Snyder and colleagues has been demonstrated in diverse populations [9, 14, 20]. Additionally, an adapted Spanish version of the CHS demonstrated adequate model fit for a two-factor structure with a cross-loading of item 5 (CFI=0.98; RMSEA=0.07; SRMR=0.03; CAIC=−29.52) [21]. The two-factor structure of hope

was used in Nepal working with cross-sectional data collected from children affected by armed conflict [9].

The Current Study

The present study sought to address the shortage of research related to psychometric properties of psychosocial wellbeing measures used in humanitarian settings that are outcomes frequently used in resilience models. We used data from interviews with children aged 9 to 17 years (n=607) participating in an evaluation of Child Friendly Space interventions in four severely-affected districts in Nepal following the 2015 earthquake. The current study examines the factor structure of the Children's Hope Scale that has yet to be documented following its use in post-earthquake humanitarian response assessments.

Method

Participants and Procedures

Data were collected as part of a broader inter-agency evaluation of Child Friendly Space interventions implemented during the early response to the 2015 earthquake. Eleven evaluation locations within four severely-affected districts in Nepal (Kathmandu, Lalitpur, Sindhupalchowk and Dolakha) were identified by an inter-agency team of child protection specialists based on an acute response needs assessment. Baseline survey and qualitative data were collected from May to July 2015, approximately one to two and a half months following the April 25th earthquake.

Community outreach was conducted in the evaluation areas one to two days preceding registration for the intervention. The field team consisted of a monitoring and evaluation specialist and team of 14 male and 15 female enumerators in Kathmandu Valley, 10 male and 10

female enumerators in Sindhupalchowk, and 8 male and 9 female enumerators in Dolakha. All families arriving during the registration window were provided with written consent forms or read orally the form in its entirety prior to conducting interviews. Informed consent was obtained in Nepali from all child participants and their caregivers. Interviews were conducted in semi-private locations close to or on the programme grounds. Each survey item was read aloud by trained enumerators and responses recorded using a mobile device (either phone or tablet). Information related to socio-demographics was also collected during interviews. The sample consisted of 607 children (280 females, 46.13%) between 9 and 17 years of age (mean±SD: 11.26±1.60).

Measures

Hope. The 6-item Children's Hope Scale (CHS) measures a child's self-perception and level of belief about personal goal-attainment, with higher sum scores indicative of more hope and goal-directed behavior [14]. Scale items include: *I think I am doing pretty well* (chs1), *I can think of many ways to get the things in life that are most important to me* (chs2), *I am doing just as well as other kids my age* (chs3), *When I have a problem, I can come up with lots of ways to solve it* (chs4), *I think the things I have done in the past will help me in the future* (chs5), *Even when others want to quit, I know that I can find ways to solve the problem* (chs6) [14]. The adapted Nepali version of the CHS consolidates the original 6-point Likert response scale into 5 response options which include 0 = *none of the time*, 1 = *a little of the time*, 2 = *some of the time*, 3 = *a lot/most of the time*, 4 = *all of the time* [22].

Developmental Assets. The 13-item Emergency Developmental Assets Profile (EmDAP) was developed for use in humanitarian settings through a collaboration of the SEARCH Institute

and World Vision International [23]. The measure is comprised of 8 asset categories (e.g. positive identity, constructive use of time, social competencies) required for children to develop and thrive into adulthood. Items, such as "I feel optimistic about the future" and "I think it is important to help people", are rated on a four-point scale ranging from "Rarely" (0) to "Almost Always" (3). Developmental status is defined as Good (score of 26-30), Adequate (21-25), Vulnerable (15-20), or Highly Vulnerable (0-14) and is noted to vary across cultures [23]. Confirmatory factor analysis conducted on samples from four emergency settings support a unidimensional factor structure for the measure [23]. Internal consistency of the total developmental assets score (Cronbach's $\alpha = .78$) was acceptable.

Positive Coping. The positive coping index was derived from the Child Protection Rapid Assessment, an inter-agency tool designed for use following the onset of an emergency [24]. This 6-item index used dichotomous response options to indicate the child's ability to identify the presence (1) or absence (0) of positive coping strategies available to children within the community as they seek to manage the effects of stress following the earthquake. The Kuder-Richardson Formula 20 of the index was moderate at 0.64.

Data Analysis

Missingness, Outliers and Normality. A total of 607 participants completed the CHS measure during the survey interview period. Among these participants, 554 completed the entire measure, 39 had one missing item, 11 had 2 missing items, 2 had 3 missing items, and 1 had 4 missing items. Little's Missing Completely At Random (MCAR) test was used to examine missing data patterns, for which the null hypothesis is that the data are MCAR [25, 26]. Our analyses revealed that our missing data was not MCAR ($\chi^2 = 82.85$, $df = 57$, $p = 0.01$), but the

assumptions for missing at random (MAR) were upheld. Our data demonstrated no covariate-dependent missingness (CDM) with age (χ^2 = 125.00, *df* = 114, *p = 0.23*), sex (χ^2 = 111.99, *df* = 114, *p = 0.54*), ethnicity (χ^2 = 152.85, *df* = 285, *p = 1.00*), primary language spoken (χ^2 = 106.82, *df* = 114, *p = 0.67*), or days between the earthquake and interview (χ^2 = 106.32, *df* = 114, *p = 0.68*).

Univariate and multivariate outliers were examined using leverage indices for each participant. Participants with a leverage score that was five times greater than the sample average were considered outliers. No outliers were detected. Multivariate normality was assessed using the Mardia test for skewness (χ^2 = 125.89, *df* = 56, *p < 0.001)* and kurtosis *(*χ^2 = 3.93, *df* = 1, *p < 0.05)* indicating skewness (1.35) and extreme kurtosis (49.65) in the sample.

To avoid the likelihood of biased parameter estimates and standard errors in our analysis, we used full information maximum likelihood (FIML) and robust weighted least squares (WLSMV) estimation in MPlus, which is considered good practice for ordinal indicators and acceptable for use amongst varying levels of non-normality [27, 28].

Descriptive statistics. Table 1 contains characteristics of the full sample and disaggregated by sex. The mean and standard deviation for each measure of interest is displayed. Table 2 contains polychoric item analysis including item-total correlations with the full scale and with each related subscale.

Reliability and validity. We evaluated the internal consistency reliability of the total CHS scale and each subscale using Cronbach's alpha coefficients. Convergent validity was explored using bivariate correlations with the EmDAP and Positive Coping index.

Confirmatory Factor Analysis. Based on prior evidence, several measurement models were tested to confirm the best fitting model for the data. Consistent with previous validation studies, Model 1 presents a unidimensional factor structure in which all indicators load freely onto a single latent variable of hope [17]. A second unidimensional model (Model 2) was specified in which the error terms of item 1 varies with item 3 and the error terms of item 4 varies with item 6 in line with recent research [17]. The first loading of both 1-factor models was fixed to 1.0. Model 3 presents a two-factor model in which items 1, 3 and 5 load onto a latent variable of *agency*, and in which items 2, 4 and 6 load onto a latent variable of *pathways* [14]. The latent variables were subscales of the Children's Hope Scale and had a range of scores from 0 to 12, with higher scores indicative of higher levels of the specified hope dimension. Measurement model 3 contain no double-loading indicators while measurement model 4 allows item 5 to be cross-loaded in response to recent evidence in support of this structure [21]. All measurement error in the 2-factor models were presumed to be uncorrelated, and the first loading of each factor was fixed to 1.0.

Raw data were input into MPlus 8.0 [29]. Confirmatory factor analysis was conducted using robust weighted least squares (WLSMV) estimation. All models were adjusted for design features (sampling site) as well as age, sex, ethnicity, primary language, and days between the earthquake and interview. Goodness of fit for each model was evaluated by using the nested chi-squared difference test (χ^2_{diff}), weighted root mean square residual (WRMR), root mean square error of approximation (RMSEA) and its 90% confidence interval (90% CI), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). Criteria for acceptable model fit included a non-significant chi-squared difference test, RMSEA (≤ 0.06, 90% CI ≤ 0.06), WRMR (< 1.0), CFI (≥ 0.95), and TLI (≥ 0.95) [28].

Results

All results are based on the administration of the CHS during baseline assessment as the aim of this study was to examine only its factor structure during this time period.

Descriptive Statistics. CHS scores ranged from 1 to 24 with a mean of 12.07, standard deviation of 4.45, and did not significantly differ by sex ($p = 0.61$, ns). Bivariate testing revealed no significant relationships between CHS scores and age, sex, ethnicity, primary language (see Table 1). There was a significant relationship between CHS and the number of days since the earthquake ($\beta = -.104$, $p = 0.001$).

Reliability and Validity. Internal consistency of the one-dimensional hope factor (Cronbach's $\alpha = .71$) was fair while consistency for the two factors ($\alpha = .58$ for *pathways*, $\alpha = .54$ for *agency*) were poor. The internal consistency of the two factors is lower than indicated in previous studies conducted with children affected by armed conflict in Nepal [7, 30, 31]. All items showed significant positive relationship with the total scale score (0.62 – 0.75) and with their respective subscale (0.73 – 0.80). Our results indicate adequate convergent validity, demonstrated by the positive significant correlation between the CHS and the associated constructs of positive coping ($r = 0.43$, $p<.001$) and developmental assets ($r = 0.48$ $p<.001$).

CFA. Each of the overall goodness-of-fit indices suggested that both two-factor models fit the data well: $\chi2$ (28) = 32.93, p=0.17, WRMR = 0.605, RMSEA = 0.020 (90% CI = 0.00 - 0.04), TLI = 0.988, CFI = 0.992 for Model 3; and $\chi2$ (27) = 34.94, p=0.14, WRMR = 0.601, RMSEA = 0.022 (90% CI = 0.00 - 0.04), TLI = 0.985, CFI = 0.995 for Model 4 (see Table 3). The nested chi-square difference test between Model 3 and Model 4 indicated no appreciable model preference in the data ($\chi_{diff}^2 = 0.44$, $p = 0.51$, ns). Inspection of standardized residuals and

modification indices of Model 3 and Model 4 revealed one localized point of ill fit in the solution related to the cross-loaded item 5 in Model 4. Unstandardized and standardized parameter estimates from Model 3 and Model 4 with standard errors are presented in Table 4. Factor loading estimates of Model 3 and 4 revealed that the indicators were weakly to moderately related to their purported factors (range of $R^2 = 0.23\text{-}0.56$).

Discussion

The present study examined the psychometric properties of the Nepali version of the Children's Hope Scale among a sample of children aged 9 to 17 years residing in four severely-affected districts following the 2015 earthquake. Results suggest a two-factor structure model of hope, consistent with the original validation research and previous studies among conflict-affected children in Nepal, Burundi and Indonesia, is preferred [9, 14]. There is mixed evidence to suggest that the loading of item 5 onto both factors provides enhanced model fit in line with existing evidence [17, 21]. Additional research should be directed to ascertain the measurement invariance of both unidimensional and two-factor structure models amongst age and gender subgroups and over time. This will allow for a more comprehensive judgment of factor structure preference in the data.

The current study is the first to test the factor structure of the CHS used in an evaluation implemented during a rapid-onset natural disaster. The validation of the components of *agency* and *pathways* suggests potentially important foci for interventions implemented in humanitarian contexts. Supporting children in their identification of pathways of action, as well as means of promoting their sense of agency, is consistent with emerging understanding of resilience as involving both navigation towards relevant resources and also negotiation of access to them [32].

Further validation studies of mental health and psychosocial measures used in humanitarian settings should be prioritized to support the development of additional evidence-driven programming approaches that ensure lasting resilient developmental trajectories for children. These studies will ensure more culturally relevant and impactful programming approaches are used by humanitarian practitioners. Psychometric studies will also confirm the accuracy of measurement of complex constructs used to determine the ultimate success of the program. This will promote the use of more rigorous indicators or locally-derived measures to examine program effects and provide a sound basis on which to recommend and prioritize improvements.

References

1. Inter-Agency Standing Committee: **IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings.** Geneva: IASC; 2007.

2. Ager A, Annan, J., & Panter-Brick, C.: **Resilience: From conceptualization to effective intervention.** In *Policy Brief for IRC Strategic Planning Meeting, May 6, 2013*; 2013.

3. Ager A, Metzler J: **Where there is no intervention: Insights into processes of resilience supporting war-affected children.** *Peace and Conflict: Journal of Peace Psychology* 2017, **23**.

4. Masten A, & Narayan, A.: **Child development in the context of disaster, war, and terrorism: Pathways of risk and resilience.** *Annual Review of Psychology* 2012**:**227-257.

5. Patel V, Goodman A: **Researching protective and promotive factors in mental health.** *Int J Epidemiol* 2007, **36:**703-707.

6. Tol W, Song, S., & Jordans, M.: **Annual Research Review: Resilience and mental health in children and adolescents living in areas of armed conflict – a systematic review of findings in low- and middle-income countries.** *Journal of Child Psychology and Psychiatry* 2013, **54:**445–460.

7. Jordans MJD, Komproe IH, Tol WA, Kohrt BA, Luitel NP, MacY RD, De Jong JTVM: **Evaluation of a classroom-based psychosocial intervention in conflict-affected Nepal: A cluster randomized controlled trial.** *Journal of Child Psychology and Psychiatry and Allied Disciplines* 2010, **51:**818-826.

8. Khamis V: **The mediating effects of child strengths and hopes on academic achievement for Palestinian children exposed to armed conflict.** *International Journal of School & Educational Psychology* 2013, **.1:**pp.

9. Haroz EE, Jordans M, de Jong J, Gross A, Bass J, Tol W: **Measuring Hope Among Children Affected by Armed Conflict: Cross-Cultural Construct Validity of the Children's Hope Scale.** *Assessment* 2017, **24:**528-539.

10. Loughry M, Ager, A., Flouri, E., Khamis, V., Afana, A.H., & Qouta, S.: **The impact of structured activities among Palestinian children in a time of conflict.** *Journal of Child Psychology & Psychiatry* 2006, **47:**1211-1218.

11. Morley CA, Kohrt BA: **Impact of peer support on PTSD, Hope, and functional impairment: A mixed-methods study of child soldiers in Nepal.** *Journal of Aggression, Maltreatment and Trauma* 2013, **22:**714-734.

12. Panter-Brick C, & Eggerman, M.: **Suffering, hope, and entrapment: Resilience and cultural values in Afghanistan.** *Social Science & Medicine* 2010, **71:**71-83.

13. Ungar M: **Resilience across cultures.** *British Journal of Social Work* 2008, **38:**218-235.

14. Snyder C, Hoza, B., Pelham, W., Rapoff, M., Ware, L., Danovsky, M., Highberger, L., Rubinstein, H., & Stahl, K.: **The Development and Validation of the Children's Hope Scale.** *Journal of Pediatric Psychology* 1997, **22:**399-421.

15. Snyder CR, Shorey HS, Cheavens J, Pulvers KM, Adams VH, III, Wiklund C: **Hope and academic success in college.** *Journal of Educational Psychology* 2002, **.94:**pp.

16. Marques S, Pais-Ribeiro, J., & Lopez, S.: **Validation of a Portuguese version of the Children's Hope Scale.** *School Psychology International* 2009, **.30:**pp.

17. Savahl S, Casas, F., & Adams, S.: **Validation of the Children's Hope Scale Amongst a Sample of Adolescents in the Western Cape Region of South Africa.** *Child Indicators Research* 2016, **9:**701-713.

18. Zhao B-H, Sun Y: **Reliability and validity of the Chinese vision of Children's Hope Scale.** *Chinese Mental Health Journal* 2011, **.25:**pp.

19. Shadlow JO, Boles RE, Roberts MC, Winston L: **Native American children and their reports of hope: Construct validation of the Children's Hope Scale.** *Journal of Child and Family Studies* 2015, **24**.

20. Valle MF, Huebner ES, Suldo SM: **Further Evaluation of the Children's Hope Scale.** *Journal of Psychoeducational Assessment* 2004, **.22:**pp.

21. Pulido-Martos M, Jimenez-Moral, J., Lopez-Zafra, E., & Ruiz, J.: **An Adaptation of the Children's Hope Scale in a Sample of Spanish Adolescents.** *Child Indicators Research* 2014, **7:**267-278.

22. Van Ommeren M, Sharma, B., Thapa, S., Makaju, R., Prasain, D., Bhattaria, R., & de Jong, j. T. V. M.: **Preparing instruments for transcultural research: use of the translation monitoring form with Nepali-speaking Bhutanese.** *Transcultural Psychiatry* 1999, **36:**285-301.

23. Scales P, Roehlkepartain, E., Wallace, T., Inselman, A., Stephenson, P., & Rodriguez, M.: **Brief report: Assessing youth well-being in global emergency settings: Early results from the Emergency Developmental Assets Profile.** *Journal of Adolescence* 2015, **45:**98-102.

24. Child Protection Working Group: **Child Protection Rapid Assessment Toolkit.** 2012.

25. Little R: **A test of missing completely at random for multivariate data with missing values.** *Journal of the American Statistical Association* 1988, **83:**1198-1202.

26. Little R, & Rubin, D.: **The Analysis of Social Science Data with Missing Values.** *Sociological Methods & Research* 1989, **18:**292-326.

27. Li CH: **Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares.** *Behavior Research Methods* 2016, **48:**936-949.

28. Brown T: *Confirmatory Factor Analysis for Applied Research.* 2nd edn. New York, NY: The Guilford Press; 2015.

29. Muthén LK, & Muthén, B. O.: *Mplus User's Guide.* Eighth edn. Los Angeles, CA: Muthén & Muthén; 1998-2017.

30. Tol WA, Komproe IH, Susanty D, Jordans MJ, Macy RD, De Jong JT: **School-based mental health intervention for children affected by political violence in Indonesia: A cluster randomized trial.** *JAMA: Journal of the American Medical Association* 2008, **300:**655-662.

31. Tol WA, Komproe IH, Jordans MJD, Ndayisaba A, Ntamutumba P, Sipsma H, Smallegange ES, Macy RD, de Jong JTVM: **School-based mental health intervention for children in war-affected Burundi: A cluster randomized trial.** *BMC Medicine* 2014, **12**.

32. Ungar M: **The social ecology of resilience: Addressing contextual and cultural ambiguity of a nascent construct.** *American Journal of Orthopsychiatry* 2011, **81**.

Tables and Figures

Table 1. Sample Characteristics

	Total Sample[a]	Girls[b]	Boys[c]	p
Age, mean (SD)	11.26 (0.06)	11.27 (0.10)	11.26 (0.08)	0.966
Ethnicity, n (%)				
BCT	274 (45.14%)	131 (21.58%)	143 (23.56%)	0.497
Magar, Gurung, Tamang, Rai	199 (32.78%)	87 (14.33%)	112 (18.45%)	
Newar	53 (8.73%)	20 (3.29%)	33 (5.44%)	
Dalit	65 (10.71%)	34 (5.60%)	31 (5.11%)	
Other	16 (2.64%)	8 (1.32%)	8 (1.32%)	
District, n (%)				
Kathmandu	196 (32.29%)	94 (15.49%)	102 (16.80%)	0.164
Lalitpur	47 (7.74%)	26 (4.28%)	21 (3.46%)	
Sindhupalchowk	64 (10.54%)	40 (6.59%)	24 (3.95%)	
Dolakha	300 (49.42%)	167 (27.51%)	133 (21.91%)	
Measures of interest, mean (SD)				
Children's Hope Scale	12.07 (4.45)	12.18 (4.36)	11.98 (4.52)	0.605
Factor: Agency	6.76 (2.57)	6.80 (2.50)	6.73 (2.62)	0.349
Factor: Pathways	5.30 (2.52)	5.35 (2.52)	5.26 (2.51)	0.551
Developmental Assets (EMDAP)	26.83 (5.90)	27.44 (5.54)	26.32 (6.14)	0.154
Positive Coping (POSCOPE)				

[a]N=554. [b]n=280. [c]n=327.

Table 2. Item analysis and item-total correlations

				Item total r	
CHS Item	**M (SD)**	**Sk**	**Ku**	**Total**	**Subscale**
1. I think I am doing pretty well.	2.27 (1.11)	0.037	1.873	0.641	0.737
2. I can think of many ways to get the things in life that are most important to me.	1.82 (1.05)	0.219	2.315	0.620	0.731
3. I am doing just as well as other kids my age.	1.96 (1.28)	-0.078	1.941	0.624	0.736
4. When I have a problem, I can come up with lots of ways to solve it.	1.88 (1.13)	0.097	2.291	0.675	0.782
5. I think the things I have done in the past will help me in the future.	2.53 (1.17)	-0.44	2.211	0.750	0.791
6. Even when others want to quit, I know that I can find ways to solve the problem.	1.59 (1.22)	0.403	2.163	0.712	0.801

Agency Subscale Items: 1, 3, 5. Pathways Subscale Items: 2, 4, 6. Sk: skewness. Ku: kurtosis.

Table 3. Robust Weighted Least Squares standardized and unstandardized estimates for Model 3 and Model 4

Parameter	B	SE	β	SE	R^2
Model 3					
agency -> chs1	1.000	0.000	0.534**	0.038	0.285
agency -> chs3	0.901	0.103	0.483**	0.039	0.283
agency -> chs5	1.437	0.140	0.750**	0.035	0.233
pathways -> chs2	1.000	0.000	0.532**	0.038	0.352
pathways -> chs4	1.122	0.109	0.593**	0.034	0.563
pathways -> chs6	1.287	0.118	0.673**	0.033	0.453
agency with pathways	0.210	0.025	0.846**	0.049	-
Model 4					
agency -> chs1	1.000	0.000	0.558**	0.048	0.298
agency -> chs3	0.980	0.103	0.502**	0.046	0.242
agency -> chs5	1.118	0.425	0.625*	0.207	0.534
pathways -> chs2	1.000	0.000	0.546**	0.042	0.283
pathways -> chs4	1.122	0.108	0.612**	0.038	0.351
pathways -> chs5	0.295	0.384	0.161	0.209	-
pathways -> chs6	1.286	0.118	0.702**	0.038	0.452
agency with pathways	0.209	0.026	0.822**	0.074	-

*p<.01; ** p<.001

Table 4. Fit indices of the four CHS models

	chi-square difference testing									
Model	**χ^2**	***df***	**p**	**$\Delta\chi^2$**	**p**	**RMSEA**	**90% CI**	**CFI**	**TLI**	**WRMR**
Model 1	52.239	34	0.02	-	-	0.030	[0.011 0.045]	0.980	0.973	0.753
Model 2	48.175	32	0.03	4.243	0.12	0.029	[0.008 0.045]	0.982	0.975	0.724
Model 3	32.929	28	0.17	-	-	0.020	[0.000 0.039]	0.992	0.988	0.605
Model 4	34.945	27	0.14	0.444	0.51	0.022	[0.000 0.041]	0.995	0.985	0.601

CHS = Children's Hope Scale; WLSMV = weighted least squares estimator; RMSEA = robust root mean square error of approximation; CI = confidence interval (for RMSEA); CFI = comparative fit index; TLI = Tucker–Lewis index; WRMR = weighted root mean square residual; All models adjusted for sampling site, age, sex, ethnicity, days since earthquake, and primary language

Paper 2: Examining Models of Child Resilience in Extreme Adversity

Abstract

Objectives. To compare the predictive capacity of existing resilience models on children's mental health and psychosocial wellbeing outcomes. **Methods.** The study included 607 children aged 9 to 17 years in Kathmandu, Lalitpur, Sindhupalchowk and Dolakha districts in Nepal. We analyzed the capacity of existing resilience-based analytic models in predicting levels of child-reported hopefulness, developmental assets, positive coping and psychological distress. **Results**. Four models of child resilience were evaluated for equation-level and overall model goodness-of-fit. Cumulative risk exposure models specifying adaptive assets and capacities as primary outcomes demonstrated better overall model fit compared to its nested counterpart. Practice-driven models had no predictive capacity on any child outcome. Emerging models provide promising evidence in support of a frame for resilience that explores the role of resource navigation and negotiation in psychosocial outcomes. **Conclusions**. As practitioners continue to strengthen programming approaches to ensure lasting positive impacts for children affected by emergencies, it is vital to introduce more robust models and methodologies for valid appraisal of local mechanisms that contribute to resilient trajectories for children. An emerging model of child resilience supports an enhanced understanding of how children and families differentially access social support and communal resources that support and promote the mental health and psychosocial wellbeing of children.

Introduction

Humanitarian practitioners working with children are charged with attending to the direct effects of trauma and displacement while navigating disruptions to systems of support, care and protection critical in ensuring children are still aligned to meet developmental milestones. As practitioners seek to improve outcomes for children beyond the acute response phase of humanitarian action, the concept of resilience is being used more and more as a frame for children's experience [1]. Psychosocial interventions for children, in particular, seek to mitigate and respond to risks by using resilience-based approaches to strengthen adaptive capacities and developmental assets so that the child may respond acutely and rebound more effectively to future threats [1]. Often these interventions provide critical resources, in the form of *human*, *social* and *cultural capital*, that further seek to strengthen the existing systems of support, care and protection for the child [1, 2]. The child's adjustment and enhanced capacity to navigate complex resource environments provides some indication of the child's ability to maintain or achieve a healthy developmental trajectory [3].

However, challenges remain in the overall conceptualization of resilience in childhood. A lack of consensus has delayed efforts to develop locally-derived tools and analytic approaches useful for humanitarian intervention design, quality monitoring and improvements. Current conceptual models lack the ability to measure responsive pathways of resilience that include age and culturally-appropriate developmental milestones as well as dynamic social processes that govern resource accessibility in and out of emergencies [5, 8]. Although there have been recent shifts to measure multilevel adaptive capacities and assets as primary outcomes in children [7, 8], there has yet to be a comprehensive model of child resilience that can easily incorporate systems

of resource negotiation and navigation that underscores the prominent role of social influences to their access and utilization in emergencies.

This paper examines the usefulness of existing conceptual models of child resilience in predicting mental health and psychosocial wellbeing outcomes. The predictive capacity of three existing conceptual models and one emerging model will be tested using baseline data collected as part of a broader longitudinal evaluation of children's psychosocial programming in Nepal following the 2015 earthquake. This analysis lays the foundation for more advanced pathway modeling to examine the complex local mechanisms that underpin intervention utilization in emergencies. Model 1 reflects early resilience research highlighting the importance of the accumulation of risk factors as leading exposure and the expression of symptoms consistent with psychopathology that is mediated by the adaptive capacities and assets of the child. Model 2 highlights the recent shift away from earlier deficit-models of resilience towards the measurement of adaptive capacities and assets as primary, inter-related outcomes. Model 3 highlights current practice-derived indicators of exposure that are driven by rapid assessment and evaluation efforts to identify vulnerable groups for whom the intervention may be targeted. Model 4 presents an emerging model of resilience that emphasizes the role of existing social influences that guide resource acquisition, allocation and utilization in emergencies.

Conceptual models of child resilience

Several waves of resilience research have ushered in useful additions to theory, and have also contributed to ambiguity and poor translation to practice. Contemporary models of child resilience typically include three measurement components: risk exposure, adaptation, and factors that contribute to a divergence in adaptation [4]. Efforts to understand and document the

divergence in adaptation have led to a deeper understanding of contributing factors to children's social and emotional wellbeing at various levels of the social ecology, the interaction of these levels in support of resource acquisition, and the importance of culture and context in the identification and measurement of these protective or promotive factors [5]. Promotive factors work in opposition to risk to drive positive health and wellbeing outcomes in children while protective factors moderate or reduce the effects of risk, often associated with reduced or sustained psychological symptoms or improved wellbeing outcomes [5, 6]. The underlying protective and promotive mechanisms that mediate or moderate the expression of outcomes are often highly relevant for external intervention support.

Undoubtedly, resilience research has evolved from simple relationships of risk and functionality to more complex adaptive processes and pathways in adversity [7]. Ungar and colleagues articulate resilience as not only the capacity of individuals to navigate to critical resources that sustain wellbeing, but also the interaction and communication between groups and individuals at various socio-ecological levels [8].

Model 1 incorporates each measurement component while emphasizing the role of cumulative risk in the expression of negative psychological symptoms. One of the earliest waves of resilience research involved the measurement of psychopathology in relation to an accumulation of risk factors that produce the required exposure 'dose' to not only produce negative outcomes but also establish a threshold above which the child may enter one of several adaptive response and recovery pathways [7]. Cumulative risk is a commonly used index to establish risk exposure as it examines the number of risks experienced by the child rather than the intensity or pattern of risk [9]. Models that employ this composite index demonstrate a linear relationship with outcome variables and tend to not suffer from the same threats of collinearity

and diminished statistical power common in multiple variable regression models [9]. Each index item is dichotomized into *risk* and *no risk* categories based on statistical criterion or theoretical basis, and the summation of items creates a total sum score, or cumulative risk score [9]. Variations of cumulative risk measurement include the summation of risk factors at different socio-ecological levels allowing for a comparison of multiple domains of risk exposure [9]. The cumulative risk model has been used as a useful predictive model for child development and social and emotional wellbeing, including psychological distress, conduct problems, social competency and peer relationships [9]. Challenges remain, however, in the use of cumulative risk in resilience models due to issues of temporality, the poor articulation of mediation and moderating effects, and unstandardized methods for managing cut-offs in non-binary variables [9].

Model 2 is derived from a more recent wave of resilience research that identifies the importance of adaptive capacities and assets of the child beyond previous conceptions as a mediator and as a primary outcome for children that represents positive adaptation in situations of adversity [8]. Current evaluative practice in psychosocial interventions have retained earlier notions of risk and resilience that rely heavily on deficit-models of adaptation in adversity rather than measure multilevel adaptive capacities and assets [10]. Recent shifts to a strengths-based, systems-focused model engages mechanisms of influence at all levels of the child's socio-ecological environment to better understand the child's assets and capacity to navigate and negotiate complex resource environments while still assessing risk and factors that are promotive and protective of these complex outcomes [3]. Long-term use of these models in psychosocial interventions would enable practitioners to better understand and subsequently intervene at

various levels of the child's support system to strengthen the existing capacities to mitigate and respond to future risks.

Measurement of actual risk exposures in humanitarian settings is challenging for operational and ethical reasons. Instead, humanitarian practitioners and donors alike often want to know if the intervention is accessible to those children at the margin who are most 'vulnerable' to violence, exploitation, and neglect. The complex nature of vulnerability to risk makes it challenging to measure and develop a model to examine the enhanced effects at the margins and intersection of potential categories of vulnerability. Frequently, vulnerabilities are calculated using a combination of practitioner-identified and evidence-based indicators that are predictive of poorer health and mental health outcomes for children. Items, such as sex (as a proxy for gender), ethnicity, mental and physical disability, displacement, chronic disease, and household economics are frequently inserted into assessments, but with little continuity or precision in measurement. Model 3 presents such indicators of vulnerability that were developed for the purpose of identification and tracking of vulnerable children and groups to ensure the reach of the intervention.

Model 4 presents an emerging conceptual model that assumes the risk threshold required for resilient response and recovery pathways is met in emergencies. The tipping point in whether the child will adjust and developmentally progress relies heavily on their access to resources in and out of times of crises. In other words, the acquisition, allocation and utilization of resources is a reflection of socially defined processes and systems that govern access. Resources, in the form of human, social and cultural capital, are required for recovery after stressful events and the promotion of wellbeing [2]. These resources are linked together in complex patterns and are often unevenly distributed based on existing social, economic, cultural and other contextual and

structural factors [2, 11, 12]. Model 4 uses a composite to describe the level of perceived accessibility to essential resources required for enhanced response and recovery pathways. How equitable resources are perceived to be can provide a proxy for the differential starting point of children in accessing essential resources. Promoting equity ensures principles of social justice are integrated into intervention design so they may reach and ensure healthy developmental trajectories for all children.

Methods

The evaluation study protocol and secondary data analysis were conducted with ethical approval from the Columbia University Medical Center (Reference AAAJ4352, AAAR3211). The baseline study was conducted in collaboration with World Vision International Nepal, Plan Nepal, Save the Children Nepal, and UNICEF as part of a longitudinal evaluation of the effectiveness of Child Friendly Spaces following the 2015 earthquake in Nepal [13]. Data were collected prior to the start of any intervention activities in 11 evaluation sites located in four severely-affected districts in Nepal.

Outreach was conducted in the catchment areas one to two days preceding registration for the intervention. All families arriving during the registration window were provided with written consent forms or read orally the form in its entirety prior to participating in survey interviews. Informed consent was obtained in Nepali from all child participants and their caregivers. Survey data were collected from 607 children (280 females, 46.13%) aged 9 to 17 years from May to July 2015, approximately one to two and a half months following the first earthquake. The field team consisted of a monitoring and evaluation specialist and team of 14 male and 15 female enumerators in Kathmandu and Lalitpur districts, 10 male and 10 female enumerators in

Sindhupalchowk district, and 8 male and 9 female enumerators in Dolakha district. Every effort was made to have gender matched interviews in semi-private locations close to or on the intervention premises. Each survey item was read aloud by trained enumerators and responses recorded using a mobile device (either phone or tablet). Information related to socio-demographics were also collected during interviews. Field-tested pictograms were used for outcomes measures.

Measures

Psychological distress. The Child PTSD Symptom Scale (CPSS), previously validated in Nepal [14], was used as a screen for psychological distress in children that may need referrals to more specialized support services (beyond what is offered in the current program) [15]. The 17-item measure used a 4-point scale ranging from 0 to 51. There is current debate on the appropriate factor structure of the previously hypothesized 3-factor structure comprised of clustered symptoms related to re-experiencing, avoidance and arousal in favor of a one-factor structure, or total symptom score [16, 17]. Internal consistency of the total symptom score (Cronbach's α = .82) was high in line with previous research estimates in Nepal [18]. Internal consistency of the three symptom clusters (.50 for re-experiencing, .61 for avoidance-emotional numbing, .61 for arousal) were poor to moderate.

Hopefulness. The 6-item Children's Hope Scale (CHS) measures a child's self-perception and level of belief about future goal-attainment, with higher scores indicative of more hope and goal-directed behavior. Snyder and colleagues hypothesized a 2-factor, interrelated structure required for children to envision a wide-array of paths (*pathways thinking*) to achieve goals and the

enduring positive belief that they can achieve their goals (*agency thinking*) [19]. Internal consistency of the total hopefulness score (Cronbach's $\alpha = .71$) was fair while consistency for the two factors (.58 for pathways, .54 for agency) was poor.

Developmental Assets. The 13-item Emergency Developmental Assets Profile (EmDAP) was developed for use in humanitarian settings through a collaboration of the SEARCH Institute and World Vision International [20]. The measure is comprised of 8 asset categories (e.g. positive identity, constructive use of time, social competencies) required for children to develop and thrive into adulthood. Items, such as "I feel optimistic about the future" and "I think it is important to help people", are rated on a four-point scale ranging from "Rarely" [0] to "Almost Always" [3]. Developmental status is defined in quartiles ranging from Good to Highly Vulnerable and cut-offs are known to vary across cultures [20]. Confirmatory factor analysis conducted on samples from four emergency settings support a unidimensional factor structure for the measure [20]. Internal consistency of the total developmental assets score (Cronbach's $\alpha = .78$) was acceptable.

Positive coping. Children were asked to identify whether positive coping strategies were available for children to manage stress following the earthquake using an item adapted from the Child Protection Rapid Assessment (CPRA) tool [21]. Positive coping strategies (POSCOPE) included talking and spending time with family members and friends, helping with household chores, and engaging in sports or other recreational activities. The items were then summed to create a positive coping composite ranging from 0 (no identified positive coping strategies) to 6

(high level of positive coping strategies identified). Internal consistency of the positive coping composite (Kuder-Richardson 20 = .74) was acceptable.

Cumulative risk. Risks factors for children were assessed using several socio-demographic items as well as items adapted from the CPRA [21]. Children were asked about exposure to displacement following the earthquake, parent and self-disability, parent and self-chronic disease, and family composition. Children were also asked if there was a potential for exposure to each prompted risk (1) or if there was no potential exposure to risk (0) for children in the community following the earthquake. Items included separation from peers or family members, tension within the extended family, domestic violence, sexual violence, trafficking, lack of safe play areas, crowdedness in or loss of the home, loss of personal belongings, and disruptions to household economics. The items were then summed to create a cumulative risk composite ranging from 0 (no risk exposures) to 21 (high risk exposure).

Cumulative vulnerability. Several survey items were developed based on good practice guidelines, organizational specification, and donor reporting mandates to ensure the program reach extended to those children most vulnerable within the affected communities [13]. Indicators were derived from these items to assess the following vulnerability factors: single-headed household status, child disability and chronic disease, primary caregiver disability and chronic disease, birth registration and income disruption following the earthquake. Designations of vulnerable (1) and not vulnerable (0) children were determined for each indicator and summed to form a composite indicator of cumulative vulnerability.

Resource Accessibility. With adapted items from the CPRA, children were asked if the following resource persons or institutions were available to support and protect children within the community directly following the earthquake: family elders, community leaders, police, military, religious institutions, political parties, international non-governmental organizations, community-based child protection committees [21]. Children were also asked if reporting structures and services for survivors of physical and sexual abuse were available directly following the earthquake. The items were then summed to create a resource accessibility composite ranging from 0 (no resources were perceived accessible) to 10 (high level of perceived resource accessibility).

Statistical analysis

Following data cleaning, univariate and bivariate descriptive statistics were computed for sample characteristics. Confirmatory factor analysis was conducted on all outcome measures in MPlus (version 8) in line with current factor composition specifications. Bivariate and multivariate statistics as well as partially latent structural equation modeling were performed using STATA (version 14.2 SE). All models were adjusted for sampling locations, age, sex and the number of days between the earthquake and interview date.

Results

Characteristics of the Sample

607 children aged 9 to 17 years residing in program catchment areas in Kathmandu, Lalitpur, Sindhupalchowk and Dolakha districts in Nepal were asked to participate in baseline surveys. The sample was comprised of 53.87% girls and 46.13% boys. There were no significant

differences between girls and boys on baseline outcome measures or by composition, including age (chi2=2.39, p=0.966), ethnicity (chi2 = 3.37, p = 0.50), and district (chi2 = 5.10, p = 0.168) (see Table 1).

Model 1 results

Model 1 provides evidence of developmental assets (β = 0.199, p<.001 (assets→distress) and β = -0.30, p<.001 (risk→assets)) and positive coping (β = -0.34, p<.001 (coping→distress) and β = -0.52, p<.001 (risk→coping)) as partial mediators of the association between cumulative risk and psychological distress (with the former significant association losing significance with the addition of mediators to model). There was no evidence that hope was a mediator of this relationship. Caregiver stress was not a moderator of the association between cumulative risk and psychological distress (β = -0.07, p=.72, ns). Overall, model 1 provided low equation-level fit for each mediator and the primary outcome of psychological distress and exhibited relatively high overall fit for the data (R^2=0.82) (see Tables 2 and 3).

Model 2 results

Cumulative risk was not predictive of psychological distress (β =0.006, p=.97). Higher levels of cumulative risk were predictive of lower levels of hope (β =-1.34, p<.001) and developmental assets (β =-1.36, p<.001), and less capacity to identify positive coping strategies (β =-1.41, p<.001). Higher levels of reported caregiver stress were associated with lower hope (β =-1.52, p<.001), lower developmental assets (β =-1.48, p<.001), and lower positive coping scores (β =-1.49, p<.001). Caregiver stress was not a moderator of the relationship between cumulative risk and psychological distress (β =0.17, p=.43), but was a moderator of the

relationship between cumulative risk and hope (β =0.54, p=.001), developmental assets (β =0.48, p=.001), and positive coping (β =0.74, p=.001). Overall, model 2 provided low to moderate equation-level fit for each primary outcome and exhibited relatively high overall fit for the data (R^2=0.88) (see Tables 2 and 3).

Model 3 results

Cumulative vulnerability used as the exposure variable was not predictive of any primary outcome. Equation-level and model goodness-of-fit for the data was poor (R^2=0.28) and was rejected from further consideration after non-convergence during exact-fit testing (see Table 2).

Model 4 results

Resource accessibility was not predictive of psychological distress (β =0.03, p=.68). Higher levels of perceived resource accessibility were predictive of higher reported levels of hope (β =0.58, p<.001) and developmental assets (β =0.68, p<.001), and the capacity to identify more positive coping strategies (β =0.79, p<.001). Higher levels of reported caregiver stress were associated with lower reported levels of hope (β =-0.25, p<.001) and developmental assets (β =-0.31, p<.001). Overall, model 4 provided low to moderate equation-level fit for each primary outcome and exhibited relatively high overall model fit (R^2=0.77) (see Tables 2 and 3).

Overall results

Overall, Model 2 provides a marginally better fit compared to its nested counterpart, Model 1 (G=124.66, *df*=6, p<.001). For non-nested models, the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) were used as a means of comparison, with

lower figures indicative of stronger data preference to the models [22-24]. BIC and AIC decrease as we move from model 1 to model 2 to model 4, leading us to prefer model 4 for this data.

Discussion

As the field moves towards strengths-based indicators of psychosocial wellbeing, the way in which resilience is articulated is under scrutiny. Existing models of child resilience are still not proficient in capturing the mechanisms or complexity of socio-ecological levels of influence that interfere with normative or optimal functioning in acute crises and disrupt healthy development in childhood. These mechanisms are rooted in powerful social processes that determine the child's access to resources critical for development and reducing health disparities. Thus, an augmentation of the newly emerged adaptive capacities and assets model of child resilience is proposed to include equity-driven indicators of *access* as a proxy for the dynamic systems of influence within the socio-ecological system that lead to the expression of risk, protective and promotive factors.

Practice-driven indicators developed for the purpose of identification and tracking of vulnerable children and groups proved a poor fit for the data with no predictive capacity on any child outcome. Future efforts should involve a more comprehensive multilevel assessment of risk exposure and resource accessibility as these indicators of vulnerability to risk may not be sufficient in supporting initial relief programs or long-term tracing of healthy developmental trajectories. Furthermore, a stronger cultural and contextual understanding of social and structural influences that govern how children and families navigate and negotiate resources in complex, stressful environments is required to strengthen intervention design, implementation and utilization in the critical acute phase of humanitarian response.

Limitations

This analysis was restricted to a non-representative sample of children within walking distance of each program catchment area. This may under-represent children with especially low access to resources as a result of their remote location and may not be generalizable beyond this study. Several survey items were developed to support a greater understanding of the resource environment for children and families following the earthquake. Qualitative work should be dedicated to understanding the hierarchy of importance of resources to the child and within the household that contribute to their use in situations of extreme stress.

Public Health Implications

Using this equity-driven approach to measuring child resilience provides an opportunity to better understand how children and families navigate and negotiate for essential resources in situations of extreme adversity. By measuring potential blockages in access, humanitarian practitioners can design content and integrate programming approaches across sectors to ensure long-term impacts for children and families. Future research should be directed towards strengthening emerging models and their indicators to ensure healthy developmental pathways for children in and out of emergencies. As these emerging models of resilience improve, so does our ability to measure lasting change as a result of programs and make recommendations for high-impact, evidence-driven interventions.

References

1. Ager A, Annan, J., & Panter-Brick, C.: **Resilience: From conceptualization to effective intervention.** In *Policy Brief for IRC Strategic Planning Meeting, May 6, 2013*; 2013.

2. Psychosocial Working Group: **Psychosocial Intervention in Complex Emergencies: A Framework for Practice.** 2005.

3. Ager A, Metzler J: **Where there is no intervention: Insights into processes of resilience supporting war-affected children.** *Peace and Conflict: Journal of Peace Psychology* 2017, **23**.

4. Masten A: **Global perspectives on resilience in children and youth.** *Child Development* 2014, **85:**6-20.

5. Tol W, Song, S., & Jordans, M.: **Annual Research Review: Resilience and mental health in children and adolescents living in areas of armed conflict – a systematic review of findings in low- and middle-income countries.** *Journal of Child Psychology and Psychiatry* 2013, **54:**445–460.

6. Patel V, & Goodman, A.: **Researching protective and promotive factors in mental health.** *International Journal of Epidemiology* 2007, **36:**703-707.

7. Masten A: **Resilience in children threatened by extreme adversity: Frameworks for research, practice, and translational synergy.** *Development and Psychopathology* 2011, **23:**493-506.

8. Ungar M, Ghazinour M, Richter J: **Annual research review: What is resilience within the social ecology of human development?** *Journal of Child Psychology and Psychiatry and Allied Disciplines* 2013, **54:**348-366.

9. Evans G, Li, D., & Sepanski Whipple, S.: **Cumulative Risk and Child Development.** *Psychological Bulletin* 2013, **139:**1342-1396.

10. Ager A, Robinson, S., & Metzler, J.: **Methodologies and Tools for Measuring Mental Health and Psychosocial Wellbeing of Children in Humanitarian Contexts: Report of a Mapping Exercise for the Child Protection Working Group (CPWG) and Mental Health & Psychosocial Support (MHPSS) Reference Group.** New York: Columbia University, Columbia Group for Children in Adversity and Child Protection in Crisis (CPC) Network; 2014.

11. Hobfoll S: **Conservation of resources: a new attempt at conceptualising stress.** *American Psychologist* 1989, **44**.

12. Hobfoll S, & Jackson, A.: **Conservation of Resources in Community Intervention.** *American Journal of Community Psychology* 1991, **19**.

13. Metzler J, Hermosilla, S., & Ager, A.: **Longer-term mental health, developmental and systems impacts of Child Friendly Space Interventions in humanitarian emergencies.** In *Summary Technical Report - Draft 3 October 2016*. New York, NY: World Vision International & Columbia University Mailman School of Public Health; 2016.

14. Kohrt B, Jordans, M., Tol, W., Luitel, N., Maharjan, S., & Upadhaya, N.: **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* 2011, **11**.

15. Foa E, Johnson, K., Feeny, N., & Treadwell, K.: **The Child PTSD Symptom Scale: A Preliminary Examination of its Psychometric Properties.** *Journal of Clinical Child Psychology* 2001, **30:**376–384.

16. Rincón P, Gysling M, Jiménez C, Lloyd S, Navarro MF, Retamal L, Cova F, Valdivia M, Pérez-Salas CP, Melipillán R, Haquin C: **Psychometric properties of the children's posttraumatic symptoms scale in the earthquake and tsunamis chileans' victims.** *Terapia Psicologica* 2014, **32:**57-64.

17. Stewart R, Ebesutani, C., Drescher, C., & Young, J.: **The Child PTSD Symptom Scale: An Investigation of Its Psychometric Properties.** *Journal of Interpersonal Violence* 2017, **37:**2237-2256.

18. Jordans MJ, Komproe, I.H., Tol, W.A., Kohrt, B.A., Luitel, N.P., Macy, R.D., & de Jong, J.T.: **Evaluation of a classroom-based psychosocial intervention in conflict-affected Nepal: a cluster randomized controlled trial.** *Journal of Child Psychology & Psychiatry & Allied Disciplines* 2010, **51:**818-826.

19. Snyder C, Hoza, B., Pelham, W., Rapoff, M., Ware, L., Danovsky, M., Highberger, L., Rubinstein, H., & Stahl, K.: **The Development and Validation of the Children's Hope Scale.** *Journal of Pediatric Psychology* 1997, **22:**399-421.

20. Scales P, Roehlkepartain, E., Wallace, T., Inselman, A., Stephenson, P., & Rodriguez, M.: **Brief report: Assessing youth well-being in global emergency settings: Early results from the Emergency Developmental Assets Profile.** *Journal of Adolescence* 2015, **45:**98-102.

21. Child Protection Working Group: **Child Protection Rapid Assessment Toolkit.** 2012.

22. Akaike H: **A new look at the statistical model identification.** *IEEE Transactions on Automatic Control* 1974, **19:**716-723.

23. Kline R: *Principles and Practice of Structural Equation Modeling.* 4th edn. New York, NY: The Guilford Press; 2016.

24. Raftery A: **Bayesian model selection in social research.** *Sociological Methodology* 1995, **25:**111-163.

Tables and Figures

Table 1. Sample description

	Total Sample[a]	Girls[b]	Boys[c]	p
Age, mean (SD)	11.26 (0.06)	11.27 (0.10)	11.26 (0.08)	0.966
Ethnicity, n (%)				
BCT	274 (45.14%)	131 (21.58%)	143 (23.56%)	0.500
Magar, Gurung, Tamang, Rai	199 (32.78%)	87 (14.33%)	112 (18.45%)	
Newar	53 (8.73%)	20 (3.29%)	33 (5.44%)	
Dalit	65 (10.71%)	34 (5.60%)	31 (5.11%)	
Other	16 (2.64%)	8 (1.32%)	8 (1.32%)	
District, n (%)				
Kathmandu	196 (32.29%)	94 (15.49%)	102 (16.80%)	0.168
Lalitpur	47 (7.74%)	26 (4.28%)	21 (3.46%)	
Sindhupalchowk	64 (10.54%)	40 (6.59%)	24 (3.95%)	
Dolakha	300 (49.42%)	167 (27.51%)	133 (21.91%)	
Measures of interest, mean (SD)				
Children's Hope Scale (CHS)	12.07 (4.45)	12.18 (4.36)	11.98 (4.52)	0.605
Developmental Assets (EMDAP)	26.83 (5.90)	27.44 (5.54)	26.32 (6.14)	0.154
Psychological Distress (CPSS)	22.36 (8.77)	21.29 (8.61)	23.59 (8.80)	0.699
Coping (POSCOPE)	2.90 (1.62)	2.87 (1.59)	2.93 (1.66)	0.963
Accessibility (ACCESS)	3.16 (2.21)	2.91 (2.06)	3.45 (2.34)	0.135
Cumulative Risk (cRisk)	4.42 (2.21)	4.18 (2.13)	4.69 (2.27)	0.071
Cumulative Vulnerability (cVul)	1.26 (0.91)	1.14 (0.87)	1.40 (0.95)	0.029

[a]N=554. [b]n=280. [c]n=327.

Table 2. Equation-level goodness-of-fit statistics for instruments (R-squared)

	CPSS	CHS	EMDAP	POSCOPE	Overall
Model 1	0.11	0.08	0.09	0.27	0.82
Model 2	0.02	0.26	0.27	0.44	0.88
Model 3	0.01	-0.06	-0.08	0.06	0.28
Model 4	0.01	0.23	0.31	0.54	0.77

Table 3. Standardized and Unstandardized Parameter Estimates from Structural Equation Modeling

Outcomes	Model 1‡	Model 2	Model 4
CPSS			
β	-0.12	-0.01	0.03
B	-6.77	-0.38	0.37
SE	7.33	9.49	0.89
CHS			
β	-0.28*	-1.34*	0.58*
B	-8.04*	-43.05*	3.70*
SE	1.53	9.14	0.52
EMDAP			
β	-0.30*	-1.36*	0.68*
B	-11.46*	-58.33*	5.78*
SE	2.08	12.41	0.70
POSCOPE			
β	-0.52*	-1.41*	0.79*
B	-5.41*	-16.56*	1.82*
SE	0.77	3.48	0.19

‡ Direct effects only; *p<0.001

Table 4. Values for Selected Fit Statistics for SR Models

Model	$\chi 2$	*df*	p	RMSEA	90% CI	CFI	TLI	AIC	BIC
Model 1	1960.55	435	0.000	0.076	[0.073 0.079]	0.613	0.577	33450.88	34001.94
Model 2	1835.89	429	0.000	0.074	[0.070 0.077]	0.643	0.604	33338.23	33915.74
Model 4	282.16	52	0.000	0.085	[0.076 0.095]	0.818	0.733	30316.21	30611.58

RMSEA = robust root mean square error of approximation; CI = confidence interval (for RMSEA); CFI = comparative fit index; TLI = Tucker–Lewis index; SRMR = standardized root mean square residual; All models adjusted for sampling site, age, sex, days since earthquake, and primary language

Paper 3: Exploratory Spatial Analysis: The effect of pre-existing resource accessibility on post-disaster mental health and psychosocial wellbeing outcomes of children in Nepal

Abstract

This paper examines the usefulness and feasibility of linking nationally-representative survey data to Child Friendly Space (CFS) evaluation data in predicting mental health and psychosocial wellbeing outcomes in Nepali children following the 2015 earthquake. An exploratory spatial analysis was conducted using data from the Nepal 2014 UNICEF Multiple Indicator Cluster Survey (MICS) to examine the magnitude, geographic distribution, and spatial dependence of wellbeing disparities that indicate loci of inequitable resource accessibility. Linkage of the MICS and CFS data provides an opportunity to better understand how children and families identify, navigate and acquire resources required for lasting recovery from disasters. This exploratory analysis seeks to provide a conceptual framework for how humanitarian practitioners can use existing reliable sources of information to improve contextual analysis that informs rapid assessments and indicator development to better guide program design and improvement. The work presented here outlines specific considerations that need to be examined prior to the widespread adoption and use of MICS and other nationally-representative data in humanitarian planning efforts.

Key words: equity, resilience, children, MHPSS, humanitarian

Introduction

There is a need to better identify local mechanisms that govern resource acquisition and use in emergencies to ensure more equitable outcomes for children residing in affected communities. When community-based systems of protection, care and support are disrupted by armed conflict or natural disaster, it can have devastating, long-lasting consequences for the mental health, psychosocial wellbeing, and development of children. Current inter-agency guidance recommends the mobilization of multi-layered mental health and psychosocial support (MHPSS) programming soon after the onset of emergency that incorporates basic needs, community and family supports, non-specialized and specialized supports [1]. MHPSS programs frequently seek to strengthen the child's adaptive capacities and developmental assets while also providing multi-level resource support meant to strengthen local mechanisms of support, care and protection for the child [2, 3]. MHPSS practitioners are increasingly using 'resilience-based approaches' to promote psychosocial wellbeing well beyond the acute response phase to enable children to successfully achieve developmental milestones [2].

However, widespread conceptual ambiguity and prolific use of the term resilience across sectors has contributed to challenges in its operationalization and measurement in humanitarian contexts. To ensure a valid appraisal and enhanced understanding of local mechanisms of response and recovery and how they seek to influence developmental pathways for children, practitioners with researchers need to explore new and innovative ways to support practical and robust assessment methodologies to ensure equitable access to essential, life-saving services in emergencies [4]. To do this, valid information is needed about how children and families navigate and negotiate for resources prior to the onset of disasters to unpack complex patterns of resource accessibility that in emergencies are often exacerbated.

Nationally-representative household surveys are key sources of information that can be used to support a greater understanding of underlying social mechanisms that govern access and use of resources required to promote the health and wellbeing of the child. Barriers to resources can often manifest in poorer emotional and social wellbeing outcomes and developmental delays in children. Data from the nationally-representative household surveys provide a valid appraisal of these outcomes and also a way of gauging the magnitude and distribution of disparities within and across nations potentially linked to inequitable access. These surveys also provide a range of demographic data and can be linked to geospatial datasets to test the association of certain geographic factors on indicators of child development.

The analysis presented in the following sections is exploratory in nature. It was designed to explore how MHPSS practitioners can use existing reliable sources of information to improve contextual analysis that inform rapid assessments and indicator development that, in turn, will strengthen analytic models and their conclusions used to make decisions about program design. The analysis first explores the rationale for linking nationally-representative household surveys to geographic and MHPSS evaluation data. It then highlights the composition of each data source, considerations for linkages to be made. The final stages of the exploratory analysis examine the feasibility of the construction of a composite indicator that approximates the pre-existing level of access a child living in programmatic catchment areas has to resources and the feasibility of its use as a predictor in emerging models of child resilience used in current MHPSS practice. This exploratory analysis offers a starting point for further discussion of how to improve the measurement of socially defined local mechanisms that regulate utilization of resources that are predictive of resilient pathways of child development.

Why Link Household Surveys to Geographic and CFS Evaluation Data?

Child Friendly Spaces are one of the most widely used interventions to protect and support the psychosocial wellbeing of children in humanitarian contexts [5]. Evidence from our previous research was the first to reliably document the effectiveness of a basic CFS intervention model on children's mental health, psychosocial well-being, protection and development outcomes in various humanitarian settings [6]. Findings suggested modest positive short-term impacts, with an average weighted effect size across six studies of 0.22 [6]. However, the extent to which the CFS model benefitted children varied widely as was demonstrated in Uganda with an average weighted effect size of 0.37 [6]. Learnings from across the studies suggest impacts were largely dependent on: 1) the nature, intensity and appropriateness of the activities for girls and boys, 2) the program's fit to local circumstances, and 3) the quality of its implementation [6].

As CFS are and will likely continue to be a significant part of humanitarian response to emergencies, it is important to refine our evaluative approaches to ensure we are able to measure the lasting impacts of programming for children. To do so requires the following aims. First, to accurately capture resilient pathways for children in emergencies, it is important to clearly operationalize conceptual models of child resilience to ensure effective measurement approaches are used to monitor and evaluate MHPSS interventions in humanitarian settings. Second, we must determine how useful these models are to MHPSS practitioners in developing specific program content and reach strategies that ensure equity is of paramount priority. Third, we must pursue innovations to improve these models to support more targeted and integrated external transfer of resources in emergencies that promote healthy developmental trajectories for children.

Linking household survey data from the UNICEF Multiple Indicator Cluster Surveys (MICS) to CFS evaluation data allows for such an innovation. To improve emerging models of

child resilience, valid information is needed about how children and families navigate and negotiate for resources prior to the onset of disasters [4, 7]. Geospatial analysis is one tool that can be used to support a more nuanced understanding of resource accessibility and use. It provides a platform on which to determine the magnitude and composition of disparities linked to developmental delays in children within potential programming areas. Geographic pockets of disparities may indicate blockages in resource systems that are related to local mechanisms that govern access and use. By geographically linking CFS data with a variety of other data sources, such as MICS, DHS or geospatial datasets, we can explore how pre-existing levels of access to resources are linked to mental health and psychosocial well-being outcomes that are indicators used in a promising model of child resilience [7].

Linking datasets will provide essential information for practitioners such as the pattern of pre-existing disparities that can lead to prioritizing one programming model over another. It would also provide a stronger and multi-dimensional view of the needs of children and families that can be discussed during rapid assessments to inform program content and the appropriateness of activities for various age ranges and by gender. Linked data can be used to strengthen monitoring systems in MHPSS and other humanitarian programs to ensure high-quality services, measure real-time bottlenecks in resource provision, and align with longer-term developmental goals, such as the Sustainable Development Goals (SDGs). Linked data can be used to strengthen the development of outcome indicators for child resilience and advocate for creating a catalogue of culturally appropriate and locally-derived mental health and psychosocial tools and measures for rapid deployment in emergencies.

Data

UNICEF MICS Household Surveys and Sampling

There were four MICS household surveys used in Nepal during its 2014 administration: the Household Questionnaire (HQ), the Questionnaire for individual women aged 15 to 49 years (WM), the Questionnaire administered to caregivers for children under five years (CH), and a water quality questionnaire that tests for E. coli and other bacteria (WQ) [8]. The MICS surveys provide nationally-representative data on child mortality, child health and nutrition, maternal health, water and sanitation, education, child protection, early child development, disability, and HIV/AIDS [8]. MICS modules are updated every few years with the recent 2016 version reflecting indicators aligned with the new SDGs [9]. Recently, a new post-emergency module has been integrated into household survey sets in countries that experienced armed conflict or natural disaster in the years preceding its last administration [10]. This new module provides information related to the coping strategies of children and families and the effects of the emergency on basic services, livelihoods, health and other challenges that arise from displacement [10].

The MICS household surveys utilize a two-stage cluster sampling design to ensure a representative sample is drawn at the national level, sub-national level, and from urban and rural designated areas [8]. Sub-national units in Nepal were defined by 15 sub-regions demarcated by each ecological zone (Terai, Hills, Mountains) within the five development regions of Nepal (Eastern, Central, Western, Mid-Western, Far-Western) (see Figure 1). Within each urban and rural stratum, census enumeration areas were systematically selected with probability proportionate to size [8]. The 2014 MICS covered 520 enumeration areas consisting of roughly 25 households each, for a total sample size of 13,000 households [8]. Of note, the MICS and the

Demographic and Health Surveys (DHS) use similar sampling designs making linkages between the two datasets relatively easy.

Geographic data

The MICS has yet to include geographic information systems (GIS) data collection as part of their routine household surveys. Geographic data containing information on administrative units of Nepal was drawn from the Humanitarian Data Exchange (HDX) created and maintained by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) [11].

CFS Survey Data and Sampling

Baseline survey data were collected in four severely-affected districts (Dolakha, Sindhupalchowk, Lalitpur, and Kathmandu) of Nepal following the 2015 earthquakes as part of a longitudinal evaluation of Child Friendly Spaces, conducted in collaboration with World Vision International Nepal, Plan Nepal, Save the Children Nepal, and UNICEF [12]. Sampling locations were defined by catchment areas within walking distance of planned CFS program locations. Program locations were determined by each agency following a general and sector-specific rapid assessment of needs conducted in the weeks following the earthquake. The 2015 survey sample included 280 girls and 327 boys aged 9 to 17 years residing within 11 CFS program catchment areas. Following child informed consent and caregiver assent, children were interviewed during the enrollment period the week preceding the start of any program activities in each location. GIS coordinates were collected from each program location.

Measurement tools were selected in collaboration with the inter-agency working group to ensure the measurement of program impact was in line with the objectives of the program. The

survey was comprised of six main sections: 1) demographic information, 2) questions drawn from the Child Protection Rapid Assessment (CPRA), 3) the Child PTSD Symptom Scale (CPSS), 4) the Children's Hope Scale (CHS), 5) the Emergency Developmental Assets Profile (EmDAP), and 6) a vulnerability assessment. Questions drawn from the CPRA were used to assess perceived risks for children in the community, levels of caregiver stress, perceived access to essential resources, and positive coping strategies available to children in the community [13]. The CPSS was used as a screener for psychological distress in children that may need referral to more specialized support services (beyond what is offered in the current program) [14]. The CHS was used to assess the child's self-perception and level of belief about future goal-attainment, with higher scores indicative of more hope and goal-directed behavior [15]. The EmDAP was used to measure the level of external and internal assets (e.g. positive identity, constructive use of time, social competencies) required for children to develop and thrive into adulthood [16]. Items comprising the vulnerability assessment were developed based on organizational specification and donor reporting mandates to ensure the program reach extended to those children most vulnerable within the affected communities.

Data Considerations

This exploratory analysis was conducted to determine the appropriateness of integrating a new measure of resource accessibility into a promising, emerging model of child resilience in humanitarian settings. Several considerations were reviewed prior to deciding the linkage of the two datasets was appropriate.

Appropriateness of the research question

The linking of MICS data with evaluation survey data may not be appropriate for all research questions and should be discussed thoroughly for sound theoretical basis. The purpose of the exploratory analysis was to examine how pre-existing access to resources effect the mental health and psychosocial wellbeing of children following the 2015 earthquake using a promising analytic model of child resilience. In order to assess pre-existing conditions within each of the CFS program catchment areas, we hypothesized that using nationally-representative data would support a better understanding of how children and families navigated and negotiated resources important to the health and wellbeing of children prior to the onset of the emergency. Disparities in these wellbeing indicators would signal potential barriers to accessing essential resources required to ensure the child develops and thrives into adulthood. We hypothesized that any pre-existing blockages in access would manifest itself as poorer social and emotional wellbeing outcomes following the disaster. These blockages in resource systems can then be targeted in rapid assessments to discover the root causes of the disparities and ways to reduce the barriers through targeted and integrated external intervention.

Dates of MICS surveys and CFS evaluation

The MICS survey was conducted from January to June 2014 [8]. CFS baseline survey data were collected from May to July 2015. Undoubtedly, MICS indicators shifted within the year preceding the CFS evaluation as a result of changes in infrastructure, economy, climate and other factors. Since these surveys occurred within one year of each another, they are fairly well matched to address questions related to general pre-existing conditions within the sub-regions, but would require a more nuanced trend analysis of indicators for more complex research questions.

Lack of geospatial data and coordinated management systems

Unlike the DHS Program, the MICS has yet to include the collection of GPS data for cluster coordinates routinely in recent household surveys data collection waves. Providing a similar geospatial repository as the DHS Program would allow for examination of geospatial covariates, such as population density or distance to health facilities, not collected during household surveys, but linked from trusted sources to cluster coordinates to answer research questions that are spatial in nature [17]. This would prove helpful for humanitarian practice and would allow for a more precise examination of patterns of disparities in programming areas that can support the development of local indicators of resource accessibility to integrate into regular monitoring efforts and program evaluations.

Exploratory Analysis

Methods

The exploratory analysis included four main steps. As a first step, data processing was undertaken to summarize MICS indicators at the sub-regional level. The second step involved the selection of MICS indicators to comprise the resource accessibility index (RAI) and a determination of spatial dependence was made. The third step involved linking the RAI to CFS survey data. The final step involved specification and identification of the conceptual model of child resilience used in the CFS evaluation to include the new RAI and examine its effects on the mental health and psychosocial wellbeing of children following the earthquake.

Data preparation prior to linking surveys

Due to data considerations previously discussed, proxy indicators of resource accessibility were derived from the MICS and sampling weights were applied to calculate appropriate estimates for each indicator at the sub-regional level. Figures 2a-f show the spatial distribution for the nine most relevant MICS indicators selected to comprise an accessibility composite index[1], with higher scores indicative of enhanced resource accessibility.

Results

Selection of indicators for resource accessibility index (RAI) and spatial weights

Each MICS indicator was first assessed visually at the sub-regional level using QGIS (version 2.18) (see Figures 2a-f) [18]. The selection of indicators used to develop the resource accessibility index (RAI) was based on practice and policy considerations. Each indicator was assessed for potential collinearity issues and pairs with a correlation greater than 0.5 (in absolute value) were excluded from the index. Each indicator was assessed according to whether it reached a designated cut-off signifying enhanced access (1) or limited access (0) to local mechanisms that support resource acquisition, allocation and utilization. These cut-offs were aligned with international standards (e.g. SDGs) or adapted to national benchmarks designated by the Central Bureau of Statistics for the Government of Nepal [8, 19].

Visual inspection of the RAI revealed potential clustering of limited resource accessibility, particularly in the Far-Western and Mid-Western regions (see Figure 3). Conversely, there may be potential clustering of more enhanced access to resources in the Central Terai and Hills sub-regions. In an effort to better understand this variation and provide a more rigorous contextual

[1] For the purpose of this exploratory analysis, all indicators were weighted equally in importance. Subsequent analyses should consider a more nuanced definition and hierarchy of importance related to resources.

analysis of pre-existing population characteristics, a spatial analysis was conducted to identify dependence within the data that was statistically significant.

In order to examine whether a significant spatial dependence actually exists in the data, the program GeoDa (version 1.8) was used to 1) map out the sub-regional clusters presented by each MICS indicator and the RAI, 2) indicate high and low levels of inequity within and across the sub-regional clusters, and 3) determine the direction, strength and significance of the relationship [20]. To determine how neighboring sub-regional clusters should be defined and the most efficient spatial analysis process to use, 1st and 2nd order queen contiguity weights were created and the RAI assessed for strength and significance with these weights. Although the 2nd order Moran's I is significant (I = 0.327, p=0.001) upon 999 permutations, the 1st order results demonstrate a stronger positive relationship with a Moran's I of 0.669, p-value = 0.001. This result likely suggests a significant positive spatial dependence in the data indicating neighboring sub-regional clusters tend to score similarly on the index. Upon establishing that spatial clustering exists in the data, the appropriateness of spatial weights was examined for inclusion in any subsequent analytic model. We first ran a full spatial regression model with all relevant predictors to see if the spatial lag term was still significant in the OLS model. Given its lack of statistical significance, we likely have accounted for the spatial dependence of the RAI via the introduction of our predictor variables that control for the dependence in space. Thus, no further adjustments need to be made to our subsequent child resilience models.

Linking RAI to CFS Outcome Data

Our research question focuses on the child and uses MICS information to understand the pre-existing conditions that exist within each CFS catchment area that may influence these child-

level outcomes. The catchment area for each CFS was defined as walking distance around the physical program site (roughly equivalent to 5 – 7 km). Had GIS information been available to identity MICS survey cluster coordinates, it would have been possible to interpolate estimates for each MICS indicator beyond survey cluster locations to provide more localized estimates of population characteristics. We would also potentially be able to extrapolate estimates of local conditions for areas not surveyed in the MICS, but where CFS programming areas may be planned.

Without such data, we had to manually source and manipulate shape files. We first sourced shape files from HDX containing information on administrative units of Nepal and manually manipulated district boundaries to match the 15 development regions specified in the MICS. The weighted means of each MICS indicator and the RAI were then spatially joined at the sub-regional level. Following initial spatial analysis of the RAI and the capacity of predictor variables to control for any dependence on space, each child observation in the CFS evaluation was assigned a RAI score, reflective of their sub-regional residence. This approach clearly has limitations. Without a more precise approximation of local conditions, analytic models are unable to capture the variation within the index that may be predictive of outcomes in children.

Exploratory analysis of using an emerging model of child resilience

The original partially latent structural equation model of child resilience is documented elsewhere [7]. The original model assumes the risk threshold required for resilient response and recovery pathways has already been met in humanitarian settings. Instead, it seeks to understand the pathway that exists between the child's perceived access to resources and mental health and psychosocial outcomes. Structural equation modeling allowed for a more thorough understanding of the relationships within and between these constructs within the model. A secondary purpose

of using this analytic technique was to determine its feasibility for use in a broader analysis examining resilient developmental trajectories of children affected by the earthquake.

In line with our research question, the RAI was integrated into the original model of child resilience to provide a more objective assessment of pre-existing local mechanisms that govern access and use of resources and their capacity to predict child outcomes related to psychological distress, hope, developmental assets, and the capacity to identify positive coping strategies to be used by children in the community. The results of both the original and RAI integrated fully latent structural equation models are presented in Figures 4 and 5. Goodness of fit for each model was evaluated by using the chi-squared test (χ^2), root mean square error of approximation (RMSEA) and its 90% confidence interval (90% CI), the comparative fit index (CFI), the Tucker-Lewis index (TLI). Criteria for acceptable model fit included a non-significant chi-squared difference test, RMSEA (≤ 0.06, 90% CI ≤ 0.06), CFI (≥ 0.95), and TLI (≥ 0.95) [21]. Since these are non-nested models, the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) were used as a means of comparison, with lower figures indicative of stronger data preference to the model [22-24].

The original model fails exact-fit testing ($\chi 2 = 2193.24$, $df = 1158$, $p<0.001$), but passes close-fit testing (RMSEA = 0.038, 90% CI [0.035 0.040], $P\ \varepsilon_0 \leq .05 = 1.00$), which in part may be due to the sensitivity of exact-fit testing to larger sample sizes. Values of approximate fit indices suggest mixed evidence with only roughly 83% improvement over the independence model (CFI = 0.838 and TLI = 0.829, respectively). Given the exploratory nature of this analysis, equation-level fit was also assessed to examine the potential predictive capacity of the latent construct of perceived resource accessibility on each of the primary outcomes. The original model provided low to high equation-level fit for each primary outcome and exhibited relatively high overall

model fit (R^2=0.85) (see Figure 4 for standardized estimates). Perceived access to resources was not predictive of psychological distress (β =-0.05, p=.35). Higher levels of perceived access to resources was predictive of higher levels of hope (β =0.62, p<.001) and developmental assets (β =0.60, p<.001), and enhanced ability to identify positive coping strategies (β =0.90, p<.001).

The integrated model also failed exact-fit testing ($\chi 2$ = 1924.99, *df* = 978, p<0.001), but passed close-fit testing (RMSEA = 0.040, 90% CI [0.037 0.043], P $\varepsilon_0 \leq .05$ = 1.00). Values of approximate fit indices suggest mixed evidence with roughly 81 – 82% improvement over the independence model (CFI = 0.823 and TLI = 0.812, respectively). The new integrated model provided low to high equation-level fit for each primary outcome and exhibited moderate overall model fit (R^2=0.41) (see Figure 5 for standardized estimates). Neither perceived access to resources nor the RAI was not predictive of psychological distress (β =-0.05, p=.45 and β =-0.01, p=.83, respectively). Higher levels of perceived access to resources was predictive of higher levels of hope (β =0.51, p<.001) and developmental assets (β =0.50, p<.001), and enhanced ability to identify positive coping strategies (β =0.79, p<.001). Enhanced pre-existing access (RAI) was predictive of higher levels of hope (β =0.49, p<.001) and developmental assets (β =0.44, p<.001), and enhanced ability to identify positive coping strategies (β =0.61, p<.001). The level of pre-existing access (RAI) was also predictive of the level of perceived access to resources (β =0.51, p<.001).

A comparison of BIC and AIC between models indicate the original model is preferred by the data. However, the lack of variation exhibited within the RAI due to data constraints limit determinations regarding its usefulness in future analyses. Future research should include strengthening indicators of pre-existing and post-emergency access to ensure accurate

measurement of core constructs that will ultimately produce stronger analytic models of resilience.

Implications for MHPSS practice and policy

Conceptual models of child resilience are frequently used by MHPSS practitioners to evaluate the effectiveness of their programming to ensure lasting positive impacts for children affected by armed conflict and natural disaster. To improve these models, valid appraisal of core indicators in the model is still required. Mainly, information is needed about the local mechanisms that govern resource acquisition and use by children and among families before, during and soon after the onset of disaster. This exploratory analysis presents such an innovation that can be used to strengthen emerging resilience models to better measure lasting programmatic benefits and healthy developmental trajectories of children affected by situations of extreme adversity.

Using geospatial analytic techniques, this exploratory analysis examined the feasibility and usefulness of linking MICS survey data to post-disaster MHPSS evaluation data. The widespread use and availability of nationally-representative survey data sources, such as DHS or MICS, presents a unique opportunity to understand pre-existing local conditions that are often complex and exacerbated in humanitarian settings. The MICS data allows us to identify geographic pockets where families are experiencing inequitable access to resources required to maintain an appropriate level of health and wellbeing. The magnitude and myriad of the disparities coupled with an external review of evidence linking these disparities to both powerful social and structural forces and developmental outcomes provides helpful insights into appropriate program models and content that is age- and gender-appropriate.

This approach also provides an opportunity to inform a more rigorous contextual analysis of pre-existing local conditions to ensure practitioners are asking the most relevant questions within the early response window when the infusion of resources is most critical. Fine tuning rapid assessment items based on this approach would enable the subsequent development of culturally and contextually specific indicators of access and wellbeing that can be tracked through regular monitoring systems and easily be linked with national databases used in development settings. As humanitarian crises become more protracted, this would support host governments in tracking and reporting in line with internationally recognized standards. This approach would also provide a strong basis to gauge the lasting impact of MHPSS programs using locally-derived and contextually specific indicators of resilience.

There are, however, several limitations that inhibit the practitioner's ability to leverage existing survey data to inform rapid assessments and strengthen program design and evaluative efforts. First, GIS information is not available to support the identification of MICS survey cluster coordinates and interpolation of results to neighboring catchment areas that is required to obtain more localized estimates of population characteristics. Without GIS information, it is difficult to extrapolate results to non-surveyed areas where program efforts may be directed in emergencies. Providing a spatial repository of geographic covariates linked to survey cluster coordinates should be prioritized to ensure trusted, valid sources of geospatial data are being used. Second, there is a lack of available data for fragile states frequently prone to conflict, such as South Sudan, or for nations where active conflict hinders the collection of data, such as Yemen where the last MICS was administered in 2006 and DHS in 2013. Finally, while this analysis weighted all resources with the RAI equally, a much lengthier discussion is required to understand the importance of

resources and the differential prioritization that takes place within household, particularly in situations of extreme stress.

These limitations provide an opportunity and call for humanitarian actors to collaborate with development partners to better understand the effects of disasters on the development and wellbeing of children. Linkages with nationally-representative survey data can strengthen the development of indicators used in current models of child resilience, advocate for the prioritization of MHPS tools and measures in preparedness planning, develop more accurate monitoring systems linked to national development efforts, and promote a more targeted and integrated programming approach with lasting benefits for children and families.

References

1. Inter-Agency Standing Committee: **IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings.** Geneva: IASC; 2007.

2. Ager A, Annan, J., & Panter-Brick, C.: **Resilience: From conceptualization to effective intervention.** In *Policy Brief for IRC Strategic Planning Meeting, May 6, 2013*; 2013.

3. Psychosocial Working Group: **Psychosocial Intervention in Complex Emergencies: A Framework for Practice.** 2005.

4. Ager A, Metzler J: **Where there is no intervention: Insights into processes of resilience supporting war-affected children.** *Peace and Conflict: Journal of Peace Psychology* 2017, **23**.

5. Ager A, Metzler, J., Vojta, M., & Savage, K.: **Child friendly spaces: a systematic review of the current evidence base on outcomes and impact.** *Intervention* 2013, **11:**133-147.

6. Metzler J, Savage, K., Yamano, M., & Ager, A.: **Evaluation of Child Friendly Spaces: An inter-agency series of impact evaluations in humanitarian emergencies.** New York and Geneva: Columbia University Mailman School of Public Health and World Vision International; 2015.

7. Metzler J, & Duch, H.: **Moving Beyond Humanitarian Silos: Examining Models of Child Resilience in Adversity.** In *APHA Creating the Healthiest Nation: Climate Changes Health; Atlanta, GA*. Edited by APHA. 2017

8. Central Bureau of Statistics: **Nepal Multiple Indicator Cluster Survey 2014, Final Report.** Kathmandu, Nepal: Central Bureau of Statistics and UNICEF Nepal; 2015.

9. **Multiple Indicator Cluster Surveys Web Portal** [http://mics.unicef.org]

10. UNICEF: **Using MICS to Understand Emergencies.** 2017.

11. **The Humanitarian Data Exchange Web Portal** [https://data.humdata.org/]

12. Metzler J, Hermosilla, S., & Ager, A.: **Longer-term mental health, developmental and systems impacts of Child Friendly Space Interventions in humanitarian emergencies.** In *Summary Technical Report - Draft 3 October 2016*. New York, NY: World Vision International & Columbia University Mailman School of Public Health; 2016.

13. Child Protection Working Group: **Child Protection Rapid Assessment Toolkit.** 2012.

14. Foa E, Johnson, K., Feeny, N., & Treadwell, K.: **The Child PTSD Symptom Scale: A Preliminary Examination of its Psychometric Properties.** *Journal of Clinical Child Psychology* 2001, **30:**376–384.

15. Snyder C, Hoza, B., Pelham, W., Rapoff, M., Ware, L., Danovsky, M., Highberger, L., Rubinstein, H., & Stahl, K.: **The Development and Validation of the Children's Hope Scale.** *Journal of Pediatric Psychology* 1997, **22:**399-421.

16. Scales P, Roehlkepartain, E., Wallace, T., Inselman, A., Stephenson, P., & Rodriguez, M.: **Brief report: Assessing youth well-being in global emergency settings: Early results from the Emergency Developmental Assets Profile.** *Journal of Adolescence* 2015, **45:**98-102.

17. USAID: **Spatial Data Repository, The DHS Program.** 2018.

18. QGIS Development Team: **QGIS Geographic Information System.** Open Source Geospatial Foundation Project; 2017.

19. IAEG-SDGs: **Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators.** vol. E/CN.3/2016/2/Rev.1, Annex IV; 2016.

20. Anselin L, Syabri, I. & Kho, Y.: **GeoDa: An Introduction to Spatial Data Analysis.** *Geographical Analysis* 2006, **38:**5-22.

21. Brown T: *Confirmatory Factor Analysis for Applied Research.* 2nd edn. New York, NY: The Guilford Press; 2015.

22. Akaike H: **A new look at the statistical model identification.** *IEEE Transactions on Automatic Control* 1974, **19:**716-723.

23. Kline R: *Principles and Practice of Structural Equation Modeling.* 4th edn. New York, NY: The Guilford Press; 2016.

24. Raftery A: **Bayesian model selection in social research.** *Sociological Methodology* 1995, **25:**111-163.

Tables and Figures

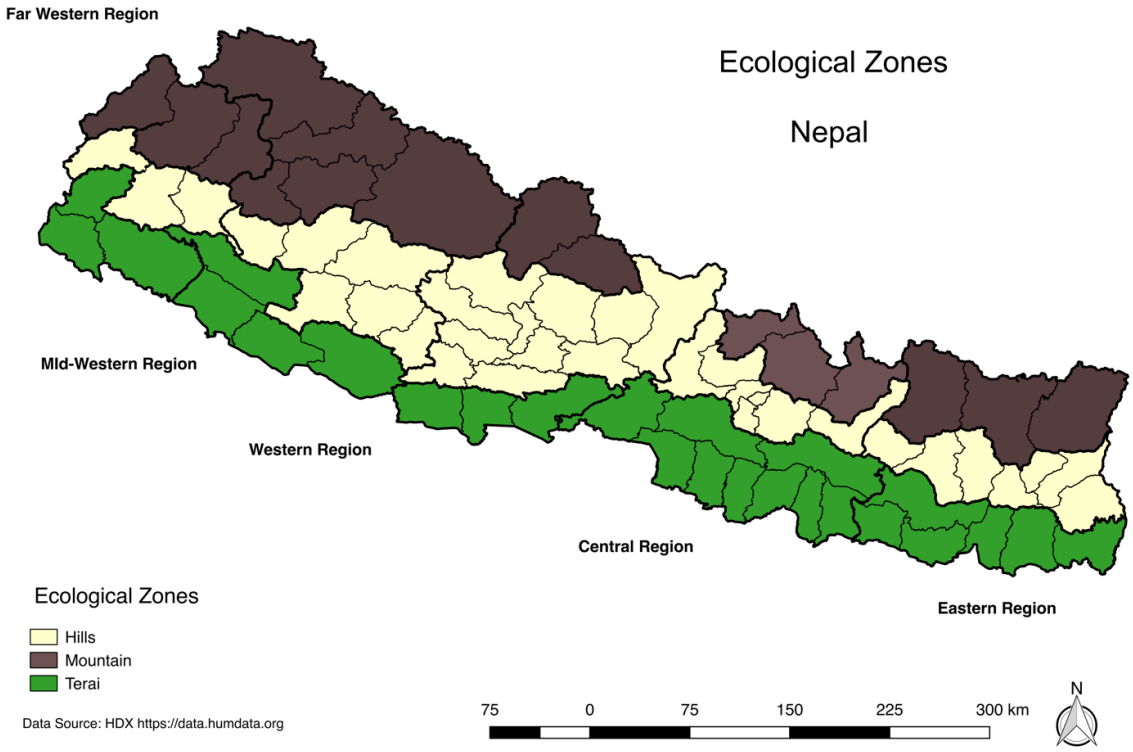

Figure 1. Development sub-regions of Nepal

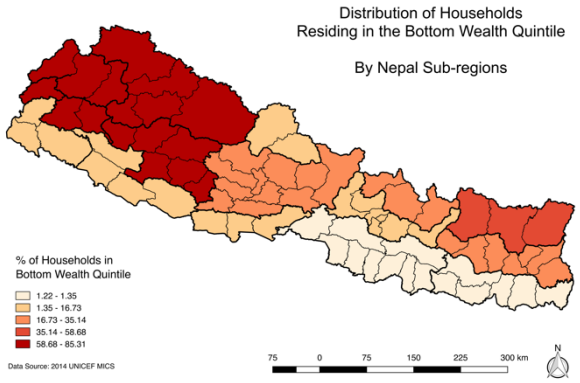

Figure 2a. Percentage of population in the bottom two wealth quintiles in each sub-region

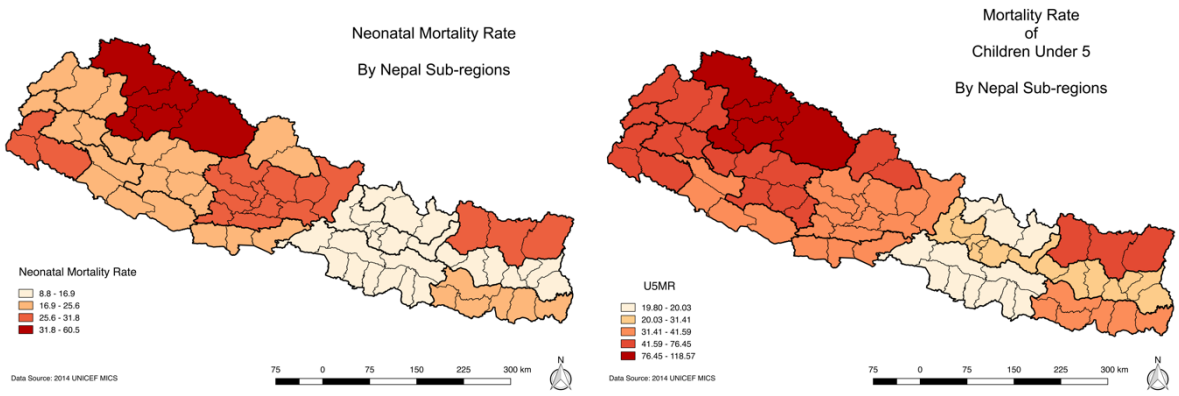

Figure 2b. Neonatal and Under 5 mortality rates of children in Nepal sub-regions

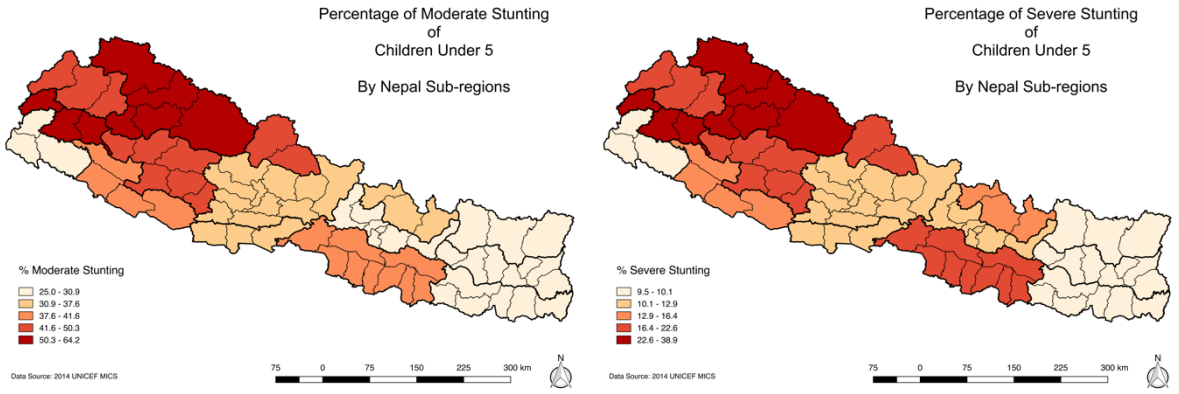

Figure 2c. Percentage of moderate and severe stunting children (12 – 59 months) in Nepal sub-regions

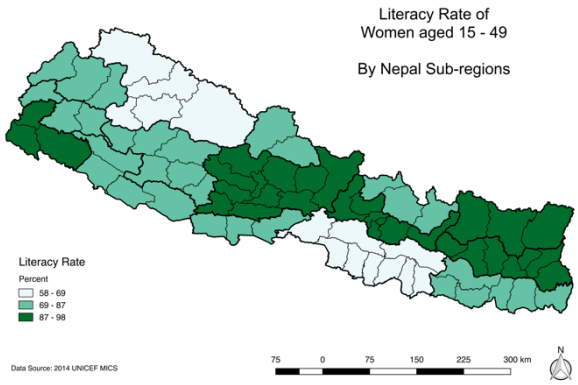

Figure 2d. Percentage of literate women (age 15 – 49 years) in Nepal sub-regions

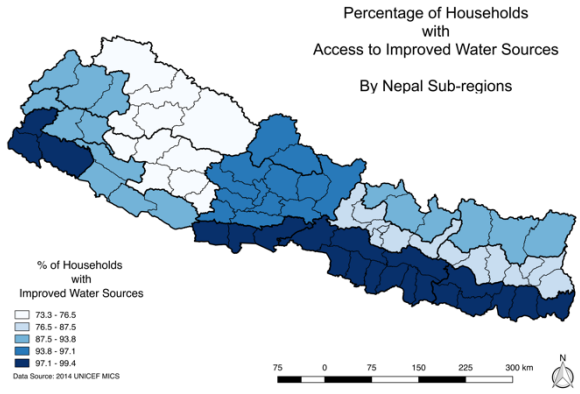

Figure 2e. Percentage of population using improved water sources in Nepal sub-regions

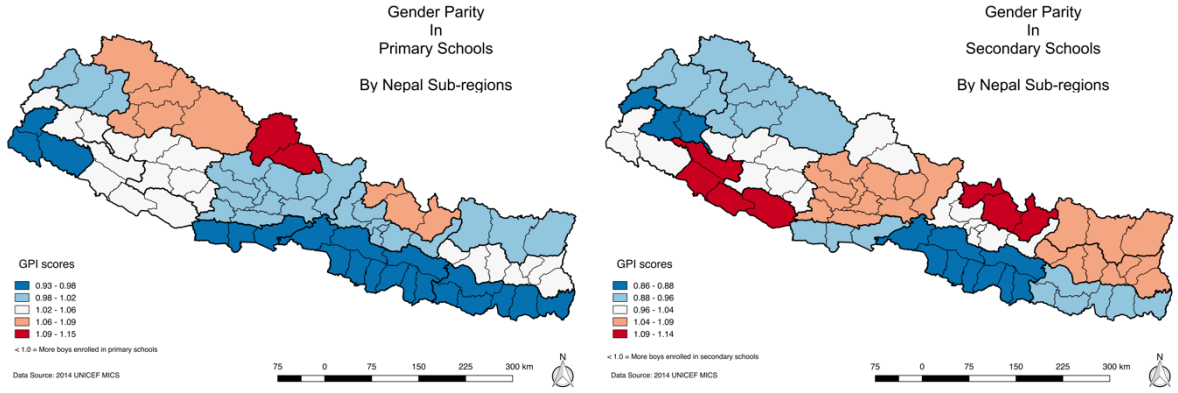

Figure 2f. Gender parity of girls and boys in primary and secondary school

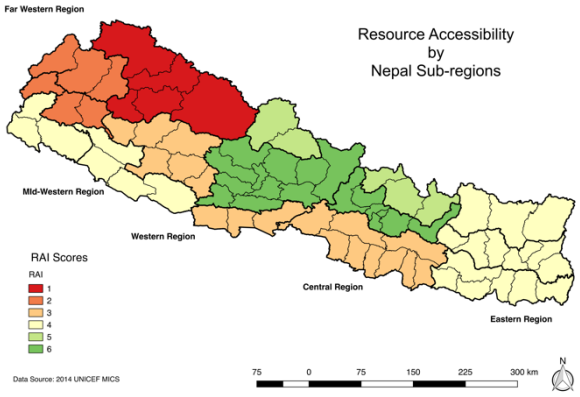

Figure 3. Resource Accessibility scores for each sub-region in Nepal

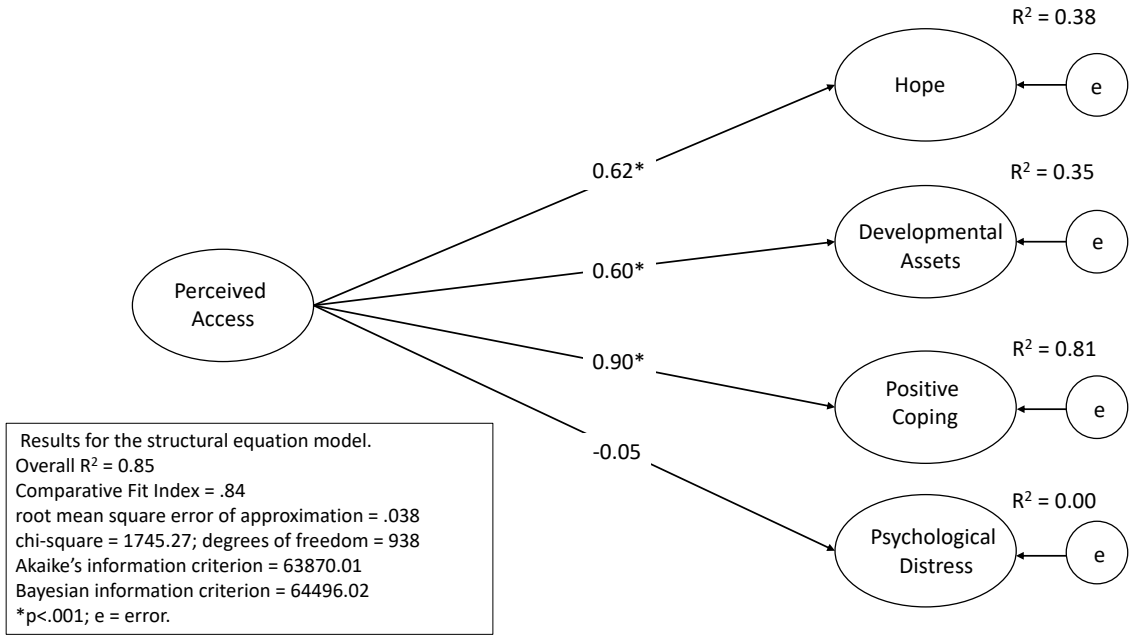

Figure 4. Simplified fully latent structural regression model of child resilience in extreme adversity driven by a subjective measure of resource accessibility

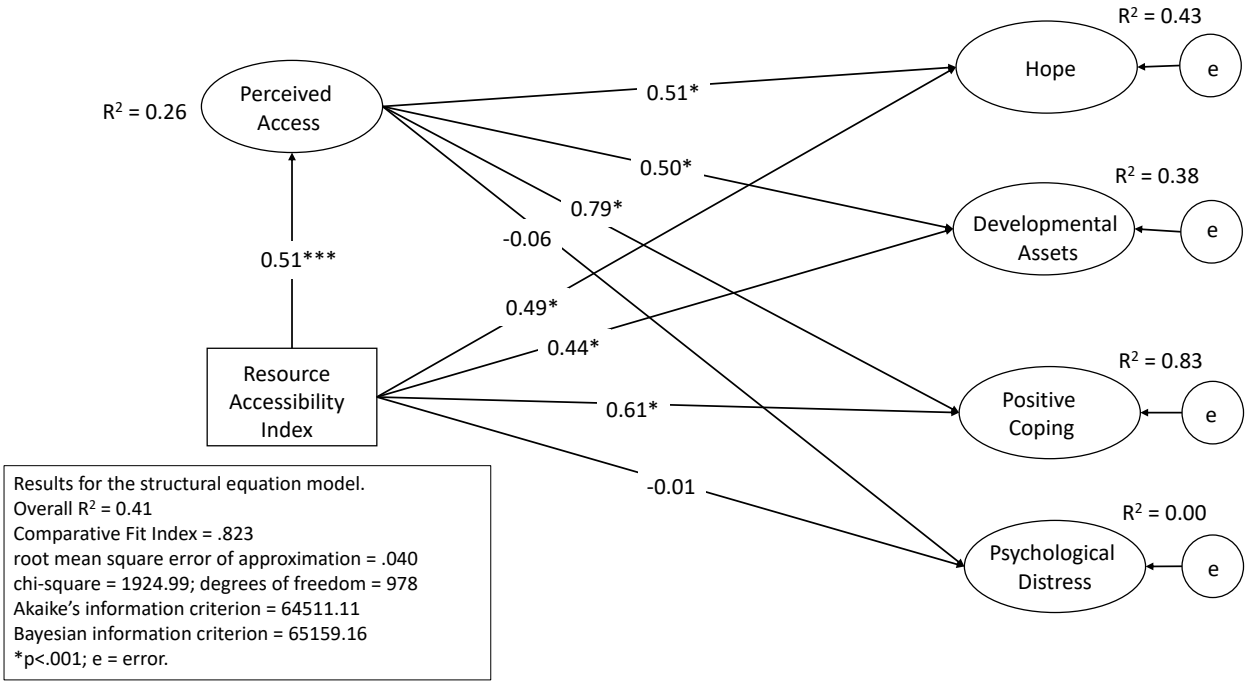

Figure 5. Simplified fully latent structural regression model of child resilience in extreme adversity driven by an objective and subjective measure of resource accessibility

Conclusion

Overview of the dissertation

This series of studies addresses the effectiveness of measurement approaches frequently used to inform MHPSS practice in humanitarian settings. First, a psychometric analysis of the Nepali Children's Hope Scale was conducted to address the death of evidence on psychosocial measures used in humanitarian settings. Next, four models of child resilience were examined for their predictive capacity of concurrent mental health and psychosocial outcomes. Finally, an innovation was presented in an exploratory analysis in support of leveraging existing data sources to strengthen emerging models of child resilience.

Summary of Findings

The psychometric properties of the Nepali version of the Children's Hope Scale was examined among a sample of children aged 9 to 17 years residing in four severely-affected districts following the 2015 earthquake. Results suggest a two-factor structure model of hope is preferred by the data. Additional analysis on measurement invariance amongst age and gender subgroups is required to examine the potential use of both the unidimensional and two-factor models of hope. Findings provide evidence of the robustness of the CHS as an overall measure of hope and is the first to test the factor structure of the CHS used in an evaluation implemented during a rapid-onset natural disaster.

The first paper combined with the confirmatory factor analysis of each child outcome laid the foundation on which to test the predictive capacity of four models of child resilience and determine their usefulness to MHPSS practice. Paper two findings suggest that current practice-driven indicators of vulnerability to risk may not be sufficient in supporting initial relief

programs or long-term tracing of healthy developmental trajectories. An emerging model of child resilience using resource accessibility as exposure provides promising support for model fit and predictive capacity of psychosocial outcomes. However, a stronger understanding of social and structural influences that determine resource accessibility in complex, stressful environments is required to better focus external intervention in emergencies.

The final paper in the series presents a theoretically-driven innovation on how to improve indicators of resource accessibility that will strengthen this newly emerging model of child resilience. Using geospatial analytic techniques, paper three examines the feasibility and usefulness of linking UNICEF Multiple Indicator Cluster Survey (MICS) data to CFS evaluation data in an effort to examine existing local mechanisms of response and recovery essential to ensuring healthy trajectories for children. The MICS data allows us to identify geographic pockets where families are experiencing inequitable access to resources that can be used to further hone indicators of resilience, improve programmatic approaches, and develop age- and gender-appropriate content.

Implications and public health significance

This dissertation represents a major contribution to the field of MHPSS in humanitarian settings, and has implications for research and programs. A recent mapping exercise commissioned by the former Child Protection Working Group and the MHPSS Reference Group revealed a dearth of evidence documenting the cultural validity and reliability of frequently used measures to assess the mental health and psychosocial wellbeing of children in humanitarian settings [1]. When psychometric properties of these complex constructs were explored, they often examined Western notions of psychopathology [1]. The first paper directly responds to the

pressing need to document the validity and reliability of psychosocial measures used in humanitarian settings to ensure accurate measurement of constructs used to determine the ultimate success of MHPSS programs. Future research should not only document the psychometric properties of psychosocial measures used in MHPSS evaluations, but seek to develop locally-derived robust measures of wellbeing that are culturally and contextually appropriate. This will ensure more rigorous indicators are developed to measure program effects and provide a sound basis on which to recommend and prioritize improvements.

Second, as humanitarian practitioners continue to refine their programmatic approaches to inspire resilient developmental pathways for children, models capable of measuring those pathways must also be strengthened. The second paper demonstrates that existing models of child resilience that rely on ad hoc indicators of vulnerability to risk are not sufficient in supporting initial relief programs or long-term tracing of healthy developmental trajectories. A more concerted effort is required to examine core indicators used in models of resilience that provide tangible direction for targeted and more equitable infusion of external resources in humanitarian practice. Future research should be directed towards developing a stronger understanding of social and structural influences that determine resource accessibility and use in complex, stressful environments.

Third, without a longer-term view of resilient pathways for children, it is difficult to determine the precise lasting benefits for children, if any, are as a result of certain programming models. The third paper presents an opportunity and a call for humanitarian actors to collaborate with development partners to better understand the effects of disasters on the development and wellbeing of children. Linkages with nationally-representative survey data can strengthen the development of indicators used in current models of child resilience, advocate for the

prioritization of MHPS tools and measures in preparedness planning, develop more accurate monitoring systems linked to national development efforts, and promote a more targeted and integrated programming approach with lasting benefits for children and families. Future research should be directed towards the development of practical tools to support rigorous contextual analysis of disaster- and conflict-prone regions and countries and synergies that may exist with rapid assessments to ensure core indicators of *access* and *resilience* are defined and measured.

References

1. Ager A, Robinson, S., & Metzler, J.: **Methodologies and Tools for Measuring Mental Health and Psychosocial Wellbeing of Children in Humanitarian Contexts: Report of a Mapping Exercise for the Child Protection Working Group (CPWG) and Mental Health & Psychosocial Support (MHPSS) Reference Group.** New York: Columbia University, Columbia Group for Children in Adversity and Child Protection in Crisis (CPC) Network.; 2014.