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Measuring resilience in the context of conflict-related sexual violence

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Appendix A: Confirmatory and Exploratory Factor Analyses

Confirmatory factor analysis (CFA)

Given that other studies employing the ARM have found varying factor structures (e.g., Arslan, 2015; Liebenberg & Moore, 2018), our first aim was to use CFA to assess the conceptual and measurement equivalence of the ARM factor structure across sites. To evaluate the CFA, we used a maximum likelihood estimator and evaluated model fit using the established criteria of a Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) >.90 (Hu & Bentler, 1999) and a Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR) <.08 (Hu & Bentler, 1999).

An initial CFA applied to the entire dataset resulted in poor fit (CFI=.69, TLI=.66, RMSEA=.08 [90% =.07-.08], SRMR=.08). When checking the fit per country, similar poor fit statistics were observed: BiH: CFI=.70, TLI=.67, RMSEA=.09, [90% CI=.08-.10], SRMR=.10; Colombia: CFI=.69, TLI=.66, RMSEA=.09, [90% CI=.08-.09], SRMR=.08; Uganda: CFI=.57, TLI=.53, RMSEA=.09, [90% CI=.08-.10], SRMR=.09). Although reviewing the modification indices suggested some ways in which the model could be improved (by freeing parameters), these improvements still did not result in a model with adequate fit, suggesting the original three-factor structure of the ARM should be reconsidered.

Exploratory Factor Analysis (EFA)

We accordingly revisited the factor structure of the ARM through EFA to determine a better-fitting model. We chose to use EFA (rather than principle components analysis) to identify

the underlying dimensions of the measure (for other examples of EFAs applied to the CYRM/ARM, see Robinson et al., 2016; Amini-Tehrani et al., 2020; Kaunda-Khangamwa et al., 2020). While similar to PCA, EFA is widely considered as the appropriate approach when investigating the dimensionality of social and psychological constructs because, unlike PCA, it takes account of measurement error and shared variance (Brown, 2006).

Given the variation in the CFA fit statistics for each country sample, and the variation in factor structures when the ARM has been used in other countries (e.g., see van Rensburg et al. 2017; Liebenberg & Moore, 2018), we determined that individual EFAs for each country would result in the most contextually appropriate solutions. For each country sample, Barlett's Test of Sphericity produced a significant finding (p <.001), indicating interrelationships between the variables (Field, 2009), and a Kaiser-Meyer-Olkin test for sampling adequacy confirmed that values fell between .6 and 1.0 (Tabachnick & Fidell, 2006) (BiH = .77; Colombia = .77; Uganda = .73).

For the EFAs, we used a maximum likelihood extraction technique and an oblique rotation strategy (oblimin), given that others have found highly correlated factors in previous structural investigations of the CYRM and ARM (e.g., Liebenberg et al., 2012). To determine factor structure we used Comrey and Lee's generally accepted thresholds for item loading values, where items loading ≥.32 are considered the minimum values for loading. Items that cross load (loadings ≥.32 on two or more factors) can be managed in various ways (see Yong & Pearce, 2013). Some suggest that a minimum separation between factor loadings indicates how to manage an item (Howard, 2016; Matsunaga, 2010), while others retain cross-loading items regardless (e.g., Le & Cheong, 2010). We reviewed each cross-loading item to see if the loading separation suggested that an item could be dropped from a particular factor. However, we were also open to retaining cross-loading items, given that some of the items in the ARM were likely to relate to multiple dimensions of resilience.

We then used multiple criteria to assess and select an appropriate model; including examining scree plots and eigenvalues, RMSEA values <.08 (Hu and Bentler, 1999), ensuring factors correlated appropriately and also Henson and Robert's (2006) 'reasoned reflection' (p. 399) concerning sensible configurations of the items per factor in factor loading matrices. In sum, we sought a parsimonious model for each country that had good statistical properties and one that possessed relatively clear and distinct factors.

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