Author's response to reviews

Title: Adverse Childhood Experiences, Psychosocial Well-being and Cognitive Development among Orphans and Abandoned Children in Five Low Income Countries

Authors:

Maya MW Escueta (mme8@duke.edu)
Kathryn Whetten (k.whetten@duke.edu)
Jan Ostermann (jan.ostermann@duke.edu)
Karen O'Donnell (karen.o.donnell@duke.edu)

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Author's response to reviews: see over
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Dear Editors, BMC International Health and Human Rights:

We thank the reviewers for the time and energy taken to carefully read and comment on this manuscript. We have taken the comments seriously and addressed these concerns, as detailed in a point by point assessment below.

Reviewer 1's report

**Title:** Adverse Childhood Experiences, Psychosocial Well-being and Cognitive Development among Orphans and Abandoned Children in Five Low Income Countries

**Version:** 1  **Date:** 30 August 2013  **Reviewer:** Gillian Morantz  **Reviewer's report:** Reviewer's report

The study described in this paper examines important questions related to the emotional state and cognitive development of orphans and abandoned children (OAC) in five countries. The study is well-designed and includes a large sample of children. I think it will be of significant interest to the readership of BMC International Health & Human Rights.

- **Major Compulsory Revisions Analyses**

  1. I believe a brief explanation of the choice of a $p < 0.1$ significance level for the results should be provided, or in the very least, this choice should be explicitly mentioned in the main text.

  Acknowledging that a higher cut off for statistical significance increases the likelihood of spurious correlations, we adjusted our analysis to use the more commonly used 0.05 cut-off.

**Conclusion**

2. It is stated that “exposure to trauma, including and in addition to the loss of a parent, is associated with higher emotional difficulties, and increases in emotional difficulties, in turn, are associated with lags in cognitive development”; however, among the main findings of the study are that, overall, orphanhood is not associated with more emotional difficulties or poorer cognitive development. Please address this inconsistency.

To address this inconsistency, we changed the wording on this section to read: “This study suggests that increased reports of exposure to potentially traumatic events among orphans and abandoned children are associated with higher emotional difficulties, and increases in emotional difficulties are associated with lags in cognitive development.” We also further elaborated on the interpretation of the finding that orphanhood alone is not associated with emotional difficulties or poorer cognitive development. We acknowledge that orphan status does not show statistical significance in the hypothesized relationship between mental health and learning. It is our interpretation that it is the cumulative effect of the life situations of children (and their exposure to adverse childhood experiences) that affect the relationship between mental health and learning. Being an orphan is one of the adverse events, but in isolation is not predictive. This interpretation is in line with previous findings in literature on vulnerable children that “cumulative effects from multiple risk factors have been shown to be more predictive of compromises to early cognitive development among vulnerable children than any one risk factor alone” (see citation on p. 3 in the Background section).

- **Minor Essential Revisions Abstract**

3. Results- instead of using the phrase “in some cases”, I recommend “at some sites” for the sake of clarity.

The changes were made as suggested. [see p. 2]
Study Sample

4. Last sentence - Instead of the control group being described as a “qualitative comparison group”, I believe “quantitative comparison group” is more accurate.

Removed “qualitative”. [see p. 4]

Predicting Emotional Difficulties

5. Last paragraph - 3rd line - “surprisingly, in orphaned and abandoned children.” Omit the “in.”

The changes were made as suggested. “Surprisingly was also taken out here and in the discussion section. [see p. 8]

Predicting cognitive development

6. First paragraph - 1st line - Write out “ordinary least squares” once.

The changes were made as suggested. [see p. 8]

7. 5th paragraph - 4th line - “between emotional difficulties ad cognitive outcomes”. Replace “ad” with “and”.

This paragraph was slightly re-written and should no longer contain the typo. [see p. 9]

● Discretionary Revisions Background

8. Given that the stated main purpose is to understand the factors related to education outcomes among OAC, the background would be strengthened by including further discussion on the link between academic performance, emotional state and cognitive development.

To address these comments, we brought in the child psychologist from the original study and referenced earlier published studies using the POFO data to broaden the discussion in the introduction about the relationship between academic performance, emotional state and cognitive development. See additions to the fourth paragraph in the Background section, in which we cited previous analyses done by POFO researchers looking at associations between schooling and cognitive measures. We also cited literature that looks at the relationship between adverse childhood experiences and cognitive development, not among orphans but among vulnerable children. [see p. 3]

Methods

9. In the methods, if possible, consider including more references to justify the choice of the instruments used to assess cognitive development as proxies for school performance.

The manuscript was changed accordingly, particularly citing the earlier analyses done by POFO researchers to validate these measures as proxies for educational attainment. The previous analyses demonstrated a strong correlation between cognition and education performance, and provided support that across these sites, the subtests acted as expected, that is, raw scores increased with chronological age as well as with schooling. With school systems and school quality varying both across and within study sites, the KABC score used here can be seen as an effective tool for measuring learning, which also reflects experience in the learning environment [see p. 5 paragraphs 3]

10. Consider briefly explaining what the scores for the various instruments mean. This would make the results seem less abstract and more meaningful to the reader.

To address this comment, more detailed explanation of the scores was included in the Measures section [see pp. 5-6]. To summarize: On the KABC, standard scores are between 0 and 19, with subtests having a mean of 10 and a standard
deviation of 3. Higher scores on the scale reflective better performance on tests of cognitive development. Nevertheless, it is important to note that while these standard scores are relevant to the US test groups used for standardization, these average scores may not necessary apply elsewhere. We used the standard score not to comment on intellectual level but to compare child performance across children and sites related to emotional difficulties and other factors.

SDQ Total Difficulties range from 0 to 40. The SDQ comprises 5 subscales with 5 items each and the Total Difficulties totals 4 of the 5 subscales (Emotional, Conduct, Hyperactivity and Peer Relationships). Each item is scores on a 3 point Likert scale (0-2), so the top score for 4 factors/5 items each is 40. We used the Total Difficulties score as a continuous variable and not using a clinical cut off which is not available across these sites, so the main interpretation is that emotional difficulties increase as scores on the Total Difficulties scale increase.

Analyses

11. Given that you have longitudinal data, would it be possible to examine potential causation between some variables e.g. between emotional difficulties at baseline and subsequent cognitive development?

The fixed effects analyses in Tables 4 and 6 take advantage of the longitudinal nature of the data, to minimize the effect of other, time-invariant characteristics on the association between emotional wellbeing and cognitive development. However, with the number of time points per child ranging only from 1 to 4 (and observations prior to age 11 missing when using child self reports), we do not have adequate statistical power to identify an appropriate lag or lead structure for the associations of interest. With adversity, its psychosocial manifestations, and cognitive development spanning much of the life span of the children in this study, including much of the time prior to children’s enrolment in the POFO study, the 3 year follow-up period does not offer sufficient within-child variation to disentangle these effects.

Discussion

12. It may be interesting to hypothesize why males have higher emotional difficulties scores. It may also be interesting to hypothesize why there are no significant overall differences in emotional difficulties or cognitive development between the OAC and the control group.

We now discuss the latter finding in more depth in the Discussion. [see paragraphs 1 and 2 of p 10]. This finding was also augmented by additional sub-group analysis conducted in the fixed effects model, which finds that, though orphan status is not predictive of emotional difficulties or cognitive development, the relationship between the latter two factors holds within orphan subgroups. In additional sensitivity analyses (not shown), the effects of difficulties scores on cognitive outcomes also did not differ by gender for either the KABC (p=0.120) or the market list (p=0.965).

We also note that the fact that orphan status is not predictive of emotional difficulties or cognitive development supports previous literature on vulnerable children, which found that “cumulative effects from multiple risk factors have been shown to be more predictive of compromises to early cognitive development among vulnerable children than any one risk factor alone” (see citation on p. 3 in the Background section). Given this background, it makes sense that in the context of multiple adversity, the loss of a parent does not show statistical significance in the hypothesized relationship between mental health and learning. It is likely that the effect of the loss of a parent is further affected by the additional adverse events to which the child is even more vulnerable. No trauma or potentially traumatic event happens in isolation.”

13. Tables 2-6 13. Explain the variable “constant” in a footnote or the main text.

Constants in linear regression models represent the estimated mean value for the (hypothetical) reference group for whom the values of all variables in the model are zero. This is noted in a footnote on p. 8.

Level of interest: An article of importance in its field
Quality of written English: Acceptable Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.
Declaration of competing interests:
I declare that I have no competing interests.

Reviewer 2's report

**Title:** Adverse Childhood Experiences, Psychosocial Well-being and Cognitive Development among Orphans and Abandoned Children in Five Low Income Countries

**Version:** 1  
**Date:** 5 November 2013  
**Reviewer:** marian bakermans-kranenburg

**Reviewer's report:**

The current paper describes the correlations between traumatic life events, emotional difficulties, and cognitive development in a multi-site sample of children aged 6-12 years in five low-income countries.

Strength of the study is the administration of a culturally sensitive cognitive test, and interviews about life events in a 3-year longitudinal design. The authors should be commended with regard to the effort they put in collecting these data.

Weaknesses of the current study are the following:

14. As noted, we cannot infer any causal link from the current paper. This is a crucial problem. Emotional difficulties could result in lower cognitive performance or the other way around. That they often go together is not new.

We acknowledge more clearly as a limitation of the manuscript that we cannot infer any causal links, and that even a large study such as POFO is underpowered to demonstrate causality on the basis of only 3 years of observations. We also acknowledge in the limitations that the relationships may go the other way around. However, we do note that previous research has found relationships between emotional difficulties, traumatic events, and developmental outcomes, though no analysis looks at a group of orphaned and abandoned children such as these. Conducting such an analysis on a unique sample of vulnerable children who are susceptible to multiple instances of adversity, including trauma, provides evidence of the nature of this relationship within a context of heightened adversity and potentially higher risk of mental health difficulties. This study first demonstrates the role of trauma as an important component in this relationship, and this is the first study to show the strong association across multiple diverse settings and a variety of subgroups of orphaned and abandoned children. While we don’t know the extent to which emotional difficulties are driving lags in cognition and vice versa, the study strongly suggests a need to address the emotional difficulties resulting from exposure to a variety of traumatic events.

15. The use of the term orphans to refer to children who lost one parent but live with their other biological parent is confusing. It is perhaps not incorrect in a purely linguistic respect, but the common sense for the definition of orphan is a child without any biological parent who is alive. In the current paper, it is the majority of ‘orphans’ who are children living with their biological parent (>40% of the total sample, >60% of the ‘orphans’). The fact that single orphans living with parents were less likely to drop out further underscores the lack of comparability between the orphans and children living with one biological parent.

To address the reviewer’s comments about how we have defined and compared our categories of orphans and non-orphans, we first clarify that we are using the commonly accepted definition of orphan -- the default convention as defined by UNICEF, which defines an orphan as a child who has lost one or both parents. **See p. 3 in the Background sections for a citation.** We also further investigated the validity of categorizing children as single orphans (by either distinguishing between living with parents or not) by testing for equality of parameters between caregiver types (i.e. children living with parents and non-parents within the single orphan category) and found no statistical difference in main outcomes (p-values 0.87 and 0.63 between these groups for both topscore and the Market list respectively). We subsequently collapsed single orphans living with parents and living with other to reduce the OAC status category to single orphan (with double orphan and abandoned as the other two categories). In relation to the reviewers concern about systematic attrition, we believe these findings suggest this is not a concern. Since type of caregiver does not seem to be a significant mediator of the observed relationships, it is not likely that differential attrition between children residing with biological parents versus other children would have biased the estimates derived from our models.
16. The children were between 6 and 12 years old at baseline. Emotional difficulties were self-reported, but children did not self-report on the SDQ until they were 11 years old (p8). A large and non-random body of missing data is thus implied.

A serious problem with self-reported data on emotional difficulties in the current sample is that children in the current sample, because of their dependency on whoever is willing to take care of them, cannot run the risk of reporting honestly about the problems they experience. This may well be an explanation for the finding that orphaned and abandoned children in Nagaland reported lower rates of difficulties than comparison children living with both parents (p7), but raises questions as to the systematic and unsystematic biases inherent to the method.

We focus on the self-reported SDQ as the main measure of emotional difficulties because it is believed that caregiver’s tend to underreport the behavioural effects related to traumatic experiences [see p. 9]. Nevertheless, we recognize that the caregiver reported SDQ is a measure providing a less biased sample in that it includes all data points for children below age 11 as well. Hence, we also checked for consistency of results with caregiver reported SDQ and now share these results in the sensitivity analysis in Tables 4 and 6, which confirm that the same relationship holds using the caregiver reported SDQ, but the magnitude is slightly smaller. These findings provide additional support of the strength of the associations between emotional difficulties and cognitive development, while also supporting the hypothesis that caregiver reports are biased towards 0 (i.e. they underreport emotional difficulties). The important finding here is that the relationship still holds when using this measure, which includes all children in the dataset. Additionally, we also believe the concern of children potentially not reporting honestly is not likely problematic as interviewers in the POFO study did everything possible to ensure that children were interviewed privately, especially for the SDQ. Although the interview still occurred in the household, interviewers took care to make sure children had privacy. While it is true that results may be compromised by an adult hearing, this is less likely given the measures taken to ensure privacy.

17. No alphas (reliability) for the SDQ scales have been reported.

We cited previous calculations of the alpha on the Total Difficulties on the SDQ, ranging from 0.73 to 0.89 (see Measures Section p. 6), as well as calculated the alpha for the scale using our own data. The alpha for the Self-reported SDQ among our own dataset is 0.73. We report this number in the Results section of the manuscript. See p 9 under Predicting Cognitive Development.

18. Were research assistants who administered the cognitive tests unaware of the status (orphan, abandoned, etc) of the children?

Yes, they were aware of the children’s OAC status.

19. What was the correlation between the KABC-II and the CVLT-C?

The correlations between topscore and CVLT-C is 0.373 and is now reported in the manuscript. See p. 9 under Predicting Cognitive Development.

20. I do not see a reason to adopt the p = .10 as alpha level in Tables and analyses. The number of analyses would rather warrant Bonferroni-corrected alpha levels.

We adjusted our analyses to use the 0.05 cut-off for statistical significance. To further reduce the likelihood of Type I errors due to spurious correlations, we also minimized the number of estimated parameters through the use of fixed effects with interaction terms rather than running entirely new (e.g. site-specific) models, particularly for sub-group analyses.
21. p 9: “As a predictor of emotional difficulties, financial stability may help provide the child with a better chance of overcoming the psychosocial challenges...” I guess I know what is meant, but this does not sound well.

We re-phrased this to be more clear: “Since financial stability is a predictor of lower emotional difficulties, such support may help provide the child with a better chance of overcoming the psychosocial challenges that are associated with lags in cognitive development.” [see p 10].

22. The conclusion is phrased in causal terms: ” exposure to trauma, including and in addition to the loss of a parent, is associated with higher emotional difficulties, and increases in emotional difficulties, in turn, are associated with lags in cognitive development.” (p10) It can’t be.

We took out the phrase “in turn” to ensure no temporal claims are being made. [See p. 11 under the Conclusion].

23. p9: “The child’s performance on the KABC tests is not only an indication of the child’s ability or IQ, but also a variety of other factors associated with motivation, self-confidence, response to authority and the child’s developed non-verbal skillset [31-2]. We may interpret the variation on test scores with the child’s emotional difficulties to be related to changes in these additional factors.” I agree, and this would easily explain the association between emotional difficulties and KABC as reported in the current paper. But that also means entanglement of the measures, and we do not know what proportion of variance in ‘real’ or ‘pure’ cognitive development is left to be explained by emotional difficulties. In combination with the design that does not allow for establishing causality, I am not sure what new insights the current study has to offer, in particular into “the relationship between psychosocial factors, resource constraints and the cognitive development of orphans” (p10).

The real insight of this paper is to confirm that the relationship between emotional difficulties and cognitive development, which we know to be true among vulnerable children in certain instances, holds specifically for orphans and abandoned children for every type of OAC sub-group. Moreover, an important factor in explaining these emotional difficulties is the potentially traumatic events that OAC are more prone to experience. The findings of this analysis shed light on the relationship between orphanhood and a child’s learning by identifying the importance of the context of heightened exposure to adverse childhood events, and its relationship to emotional difficulties. We learn that orphanhood alone is not predictive of psychosocial status or learning, but rather the aggregate of adverse childhood experiences is an important predictor. No such analysis has been conducted on a group of children as vulnerable as this, who are susceptible to multiple instances of adversity, including trauma.

To address the reviewers concerns about the entanglement of measures, the KABC tests have been validated as a good measure of learning and is one of the most frequently used test of learning ability internationally. Although the KABC appears to be one of the best indicators of learning ability in other non-American settings, there is no criterion measure with which to prepare how validly it measures pure IQ. A good portion of KABC is related to learning ability (as supported by the relationship found in previous analysis between the KABC and years of formal education); however, what other factors go into (or are captured by) one administration of the test is not known. The KABC is the closest measure of learning when there is no criterion measure for intellectual functioning,

**Level of interest:** An article of limited interest **Quality of written English:** Needs some language corrections before being published **Statistical review:** No, the manuscript does not need to be seen by a statistician. **Declaration of competing interests:** I declare that I have no competing interests

*Thank you for the opportunity to submit this manuscript. We value your time and consideration, and we look forward to hearing back from you soon.*

*Sincerely,*

_Maya Escueta, MPP    Kate Whetten, PhD, MPH    Jan Ostermann, PhD, MS    Karen O’Donnell, PhD_