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## The impact of polyvictimisation on children in LMICs: the case of Jamaica

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### ABSTRACT

Children who experience polyvictimization in high-income countries (HICs) are at higher risk for mental health-related trauma symptoms. There is limited information on the impact of polyvictimisation on children with high levels of exposure, as occurs in some low- and middle-income countries (LMICs). This study investigates the impact of polyvictimization on Jamaican children's intellectual functioning, achievement, and disruptive behaviors. Data from a geographical subgroup ( $n = 1171$ ) of a 1986 population based birth cohort study were utilised. At age 11–12 years, the sub-group completed questionnaires on exposure to violence at school, at home and in their communities, and tests of academic and intellectual functioning. Their parents completed questionnaires on family resources (socioeconomic status) and children's behaviour. Findings from Structural Equation Modelling indicated that for both genders, exposure to polyvictimisation had a direct negative effect on intellectual functioning, and an indirect negative effect on achievement mediated through intellectual functioning. For boys, polyvictimisation had a direct negative effect on behavioural risk. Family resources was negatively associated with exposure to polyvictimisation. In Jamaica, a LMIC country with high levels of polyvictimisation, there is a significant negative effect of polyvictimisation on children. The secondary- and tertiary-level interventions to address these effects are costly to LMICs with limited financial resources. Prevention of exposure to violence in all its forms is therefore the recommended approach to reduce violence-related morbidity.

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Violence; childhood; LMIC;  
Polyvictimisation; Jamaica

## Background

In the last two decades, there has been the recognition that children are exposed to many different forms of violence. Property victimization (e.g. robbery, theft), personal experiences of physical and sexual assault, maltreatment by caregivers in the home setting and indirect victimization (e.g. witnessing robbery, physical assault, physical domestic violence,

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shooting, war and losing a close friend or family member to violence) have all been included in early instruments designed to measure children's exposure to multiple forms of violence, such as the Juvenile Victimization Questionnaire and the Child's Exposure to Violence Checklist (Amaya-Jackson, 1998; Hamby & Finkelhor, 2004). A more expanded concept of polyvictimisation has considered current relevant exposures such as internet or cell phone harassment and sexual assault, and peer and sibling assault (Finkelhor, Turner, Shattuck, & Hamby, 2015). Other country-specific questionnaires have considered additional and culturally relevant aspects of violence, such as verbal aggression and corporal punishment perpetrated by teachers or other school personnel and the use of chemically disfiguring substances such as acid (Samms-Vaughan, Jackson, & Ashley, 2005; Samms-Vaughan, *in press*).

Prevalence studies indicate that in high income countries (HICs), children's exposure to polyvictimisation is high. In the USA, Canada and the United Kingdom, some 70–80% of children have experienced at least one form of violence in their lifetime (Cyr et al., 2013; Finkelhor, Ormrod, & Turner, 2009; Radford, Corral, Bradley, & Fisher, 2013). In low and middle income countries (LMICs) such as South Africa and Jamaica, lifetime exposure to at least one form of violence is considerably higher and experienced by almost every child in the samples in these countries (Kaminer, du Plessis, Hardy & Benjamin, 2013; Samms-Vaughan, Jackson & Ashley, 2005; Samms-Vaughan, *in press*). However, in some LMICs such as China, the prevalence of exposure to violence is relatively low (Dong, Cao, Cheng, Cui, & Li, 2013). Lifetime polyvictims are defined as the top 10% of those who had multiple experiences of violence, and past year polyvictims as those who had more than four different exposures (Finkelhor et al., 2009). Similar to lifetime victimization, the prevalence of past year polyvictimisation is also high.

The importance of polyvictimisation lies in its association with a higher likelihood of trauma symptoms, when compared with individual exposures. Finkelhor and Turner reported that experiencing many different forms of victimization is more highly related to trauma symptoms than experiencing repeated victimizations of a single type, and that lifetime exposure to multiple victimizations substantially accounts for the effects of individual victimization types (Finkelhor, Ormrod, Turner, & Hamby, 2005; Turner, Finkelhor, & Ormrod, 2010). In the UK, polyvictims had higher total scores on the Trauma Symptom Checklist (TSCC) than their peers (Radford et al., 2013). In China, an LMIC with a relatively low rate of polyvictimisation, past year polyvictims were more likely to suffer PTSD, depression, suicidal and self-harm ideation than non-victims and victims of one to three forms of violence (Chan, 2013). There are no studies of which the authors are aware in which the impact of polyvictimisation on child outcomes was investigated in LMICs, such as South Africa and Jamaica, with the highest published rates of exposure to polyvictimisation (Kaminer, du Plessis, Hardy & Benjamin, 2013; Samms-Vaughan, Jackson & Ashley, 2005; Samms-Vaughan, *in press*).

This study uses data from one of the few comprehensive birth cohort studies in a LMIC, the Jamaican Perinatal Morbidity and Mortality Survey (JPMMS) (Ashley, McCaw-Binns, & Foster-Williams, 1988), to investigate the associations of polyvictimisation, including indirect (witnessing) and direct (victimization) community violence, corporal punishment at home and at school and indirect (witnessing) domestic violence with cognitive, behavioural and academic outcomes in 11–12 year old children. The impact of family resources was also investigated.

This study contributes to the literature documenting the potential impact of polyvictimisation on children worldwide, and specifically, on children with exposure to very high levels of polyvictimisation, as occurs in some LMICs. It is anticipated that the information provided will be used to assist policy formulation to prevent violence against children in Jamaica, other LMICs, and HICs.

## **Method**

### ***Participants***

The participants represent a geographical sub-group of a national birth cohort of 10 500 children identified during the JPMMS of 1986–1987. The birth cohort comprised all children born September and October 1986; the methodology of the birth cohort study is described in detail elsewhere (Ashley et al., 1988). The geographical subgroup included all cohort children resident or attending school in the two most urban parishes in Jamaica, Kingston and St Andrew, from November 1997 to February 1999. Some 25% of Jamaicans lived in these parishes at this time (Population Census, 2001). These 11–12 year old children and their parents had detailed assessments completed as part of a larger study of child development and behaviour in Jamaica (Samms-Vaughan, 2001).

### ***Procedure***

As school enrolment in Jamaica was between 97.8 and 100.0% in this age group (Jamaica Survey of Living Conditions, 1996), children were identified by their date of birth from school and Ministry of Education records. Parents were preferentially seen first each morning to facilitate attendance at work. Children were released from regular classroom activities during the school day to allow completion of the full set of questionnaires and evaluations for the larger study.

### ***Measures***

This paper confines itself to parent-reported family resources, child reported experiences of violence and child outcome measures of intellectual functioning, academic achievement and behaviour.

### ***Family resources***

Family Resources was measured by three separate but related variables: occupation of the head of the household, maternal education and crowding. The occupation of the head of the household is a recognised measure of socio-economic status and is reflective of family income. Occupation was classified into five categories: unskilled, semi-skilled, skilled, technical and clerical, and professional, using a modified version of the Revised Classification of Occupations of the Statistical Institute of Jamaica. Parental education is another recognised measure of socio-economic status; it reflects the likely educational environment in children's homes. As 99.7% of 11–12- year-olds reported the presence of a mother figure, with this being the biological mother for 86.4%, while only 89% reported a father figure, with this being the biological father in only 65.4% (Samms-Vaughan, 2001), maternal/mother figure education was used in preference to paternal/father figure education. Education was classified into four categories, based on completed level of education: primary, secondary,

vocational and tertiary. Crowding, or availability of space in the home, is another common measure of socio-economic status. Primarily a measure of the physical conditions in which children live, crowding is calculated by dividing the number of rooms used for sleeping by the number of persons in the home.

### ***Exposure to violence and poly-victimization***

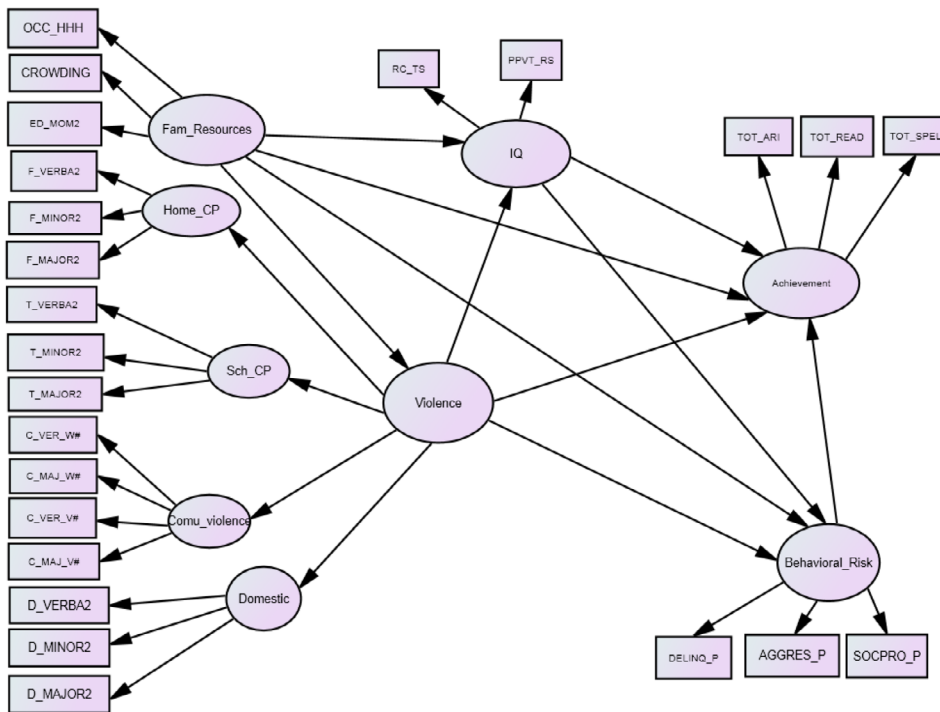
Exposure to violence and polyvictimisation were measured by a child completed Exposure to Violence questionnaire, which contained questions on exposure to community violence, as well as modifications of the original Conflict Tactics Scales (CTS) (Straus & Hamby, 1995) which captured data on verbal aggression and physical forms of violence experienced by children at home and at school, and witnessed among adults in their homes.

Questions on children's exposure to community violence enquired of their lifetime experience as witnesses and victims to fighting, robbery, stoning, stabbing, shooting, gang wars, rape, threats of serious harm, police arrest/detention, use of chemicals (acid), as well as loss of a close family friend or family member to murder and witnessing a dead body following a violent event. As with the CTS all exposures that did and did not use an implement were considered major and minor events, respectively.

The CTS, originally designed to measure disciplinary measures used for children in the home setting has 18 scored items, divided into three scales: reasoning, verbal aggression and violence. The reasoning scale was not administered in this study. Verbal aggression includes threatening, insulting/swearing, spiting, sulking/refusing to talk, stomping out of room/house, and throwing or smashing objects. The violence scale is further sub-divided into minor and severe violence categories. Minor violence includes throwing an object at a child or pushing, grabbing or slapping them. Severe violence includes kicking, biting, throwing objects at children, beating with an object and threatening with or actually using a gun or a knife. The CTS was modified for use in Jamaica to account for language and cultural differences; the modified CTS had 11 items. The language was also modified to allow for collection of data on verbal aggression and physical violence experienced by children in the school setting and observed in the home among adults. The details of the modification of the CTS for this study are documented elsewhere (Samms-Vaughan, *in press*). Many investigators have modified the CTS in different ways (Straus & Hamby, 1997).

Using the modified CTS, 97.2% of Jamaican children reported a lifetime experience of some form of verbal aggression or maltreatment (minor or major violence) from adults within their homes, with any form of verbal aggression at 82.3%, and any form of minor and major violence at 87.4 and 84.8%, respectively. A total of 86.2% of children reported a lifetime experience of some form of verbal aggression or physical violence at school. Any form of verbal aggression at school was at 49.5%, while any form of minor and major violence at school was at 74.0% and 75.4%, respectively. Some 67.5% of children reported observation of verbal aggression or violence among adults at home, with verbal aggression at 67.3%, and minor and major physical violence at 30.8 and 22.0%, respectively. In terms of community violence, children witnessed  $4.1 \pm 2.2$  of eleven possible exposures, and experienced  $1.2 \pm 1.3$  of eight possible violent acts.

Further details of the prevalence of children's witnessing and personal experiences of community violence, and exposure to violence at home, at school and among adults in their homes are documented elsewhere (Samms-Vaughan, *in press*; Samms-Vaughan et al., 2005).



**Figure 1.** Theoretical structural equation model of violence on variables of IQ, achievement and behavioural risk.

Three first order latent variables were created from the CTS indicators of number of verbal aggression, minor and major violent experiences inflicted by parents/caregivers in the home (Home\_CP), caregivers at school (Sch\_CP), and observed as family violence in the home (Domestic), as in Figure 1. A fourth (Comu\_violence) was created from numbers of experiences of witnessing and being a victim of verbal and physical violence in the community.

### **Cognitive function**

Two measures of cognitive function were administered, the Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn, 1997), which measures verbal comprehension, and the Ravens Coloured and Standard Progressive Matrices (Raven, Raven, & Court, 1996), which measure deductive reasoning.

These tests were selected for a number of reasons. First, they can be administered in a relatively short time, as compared to more detailed cognitive tests. Second their administration did not require the use of oral language, and would encourage participation by very shy children. For the PPVT, children were asked to point to one picture of four shown which best represented each word called by the examiner. For the Raven's test, children were asked to select from six patterns, the best fit to complete a fourth missing pattern given three existing patterns. Finally the tests had been used previously in studies conducted with Jamaican school children (Grantham-McGregor, Powell, Walker, Chang, & Fletcher, 1994; Walker, Grantham-McGregor, Himes, & Williams, 1994), with high test-retest reliability of .90 to .99 and inter-observer reliability agreement of .96.

A single cognitive latent variable, IQ was created from the raw scores of the cognitive function tests (RC\_TS & PPVT\_RS) (Figure 1). Both indicators loaded on the latent variable.

### **Achievement**

Academic achievement was measured using the Wide Range Achievement Test (WRAT3) (Wilkinson, 1993). The WRAT3 has three separate academic assessments: reading, spelling and arithmetic. Reading was administered individually, but spelling and arithmetic were administered in groups. Similar to the cognitive function tests, the WRAT has been used in Jamaica previously with acceptable psychometric indices (Grantham-McGregor et al., 1994; Walker et al., 1994). WRAT scores were used to create three indicators which loaded on the latent variable Achievement.

### **Behavioural risk factors**

The Achenbach System of Empirically Based Assessments (ASEBA) questionnaires are widely used measures of child behavioural and emotional functioning internationally. Behaviour reports for children 6–17 years have been extensively studied and psychometric properties have been documented for measuring child and adolescent functioning in Jamaica (Lambert, Essau, Schmitt, & Samms-Vaughan, 2007; Lambert, Samms-Vaughan, & Achenbach, 2006; Lambert et al., 2003). The Child Behaviour Checklist (CBCL) Parent Report, with over 100 questions, identifies eight individual syndromes: withdrawn, somatic complaints, anxious/depressed, social problems, thought disorder, attention problems, delinquent behaviour and aggressive behaviour. The syndromes most likely to be influenced by exposure to violence were those selected for study: social problems, delinquent behaviour and aggressive behaviour. Scores on these dimensions were used as indicators for a Behavioural Risk Factor latent variable (Behavioural\_Risk). The CBCL has previously been used in Jamaica and has shown acceptable psychometric indices (e.g. test-retest reliability = .89 and inter-observer agreement .79, see Lambert et al., 1994). More recently, the parent report has been extensively studied and its psychometric properties documented for measuring child and adolescent functioning in Jamaica. (Lambert et al., 2003, 2006).

### **Data analyses**

Simple frequencies were used to report descriptive statistics for categorical variables; means and standard deviations were used to report descriptive statistics for continuous variables.

Analyses were conducted to test the model in Figure 1, using Structural Equational Modelling (SEM). That is, to test the associations among polyvictimisation, cognition, academic achievement, behaviour and family resources among 11–12 year old Jamaican children. We further tested whether the pathways in the model were identical for boys and girls. Prior to testing such models we tested whether the models possessed configural and metric invariance across males and females. Invariance is important, as its absence makes it difficult to approximate true differences or similarities across genders.

### **Configural invariance**

Configural invariance addresses whether the factor structure of measures used are the same as those established when the measures were developed in the USA, including whether the number of factors extracted from one group is the same for another and whether the same

items load on the factors for each group studied (Campbell, Barry, Joe, & Finny, 2008; Lavoie & Douglas, 2012). Confirmatory factor analyses (CFAs) were used to test for configural invariance on boys and girls separately.

### **Metric invariance**

Metric invariance measures the degree to which items load on a given factor and whether such loadings are identical across groups. Campbell et al. (2008) argued that the presence of metric invariance means that the groups studied are likely to be interpreting the items in a similar fashion.

### **Model fit**

CFA and structural equation modelling (SEM) require that the model is appropriately specified and that the covariance structure of the data fit the hypothesized model. That is, there is no significant difference between the covariance structure of the data and that of the hypothesized model (Iacobucci, 2010). Stable SEM parameter estimates require large sample sizes such as that used in the present study. Yet, the chi square which is the only true statistical test for data to model fit in SEM is highly sensitive to large sample sizes. This phenomenon can result in rejection of a well-fitting model if used exclusively. Hence, additional fit indices that are less sensitive to sample size were utilized. If fit indices meet a priori established criteria for model fit, one can more confidently infer that data fits the hypothesized model (Chen, 2007). Indices of absolute fit, such as the Root Mean Square Error of Approximation (RMSEA), measure how poorly fitting a model is; lower values are considered as proxies of better fit. On the other hand, fit indices such as the Tucker Lewis Index (TLI) and Comparative Fit Index (CFI) are incremental fit indices, since higher values are considered to be indicators of better fit. Although Hu and Bentler (1999) have argued that CFI and TLI  $\geq .95$  as well as RMSEA  $< .08$  should be considered as indicators of good data to model fit, others (e.g. Vandenberg & Lance, 2000) have argued that their criteria might be too stringent and that  $\geq .90$  in these incremental fit indices are acceptable cutoffs for good fit, especially if sample sizes are large (e.g.,  $n > 50$ ) (see Iacobucci, 2010). Because our sample size is large, we deemed good data to model fit if CFI and TLI are  $\geq .90$  and RMSEA  $\leq .08$ .

The typical test of invariance has been the chi square difference test ( $\Delta\chi^2$ ). It has been argued that while the chi square test is inappropriate for model testing,  $\Delta\chi^2$  test is considered appropriate for comparing nested models. More recently, researchers (e.g. Chen, 2007) have conducted Monte Carlo studies on the use of  $\Delta\chi^2$  test in model comparison. Such studies have shown that the standards held for the  $\chi^2$  (i.e. where caution underscores that a large sample size such as ours can result in significance and rejection of a good model fit) are not typically held for the  $\Delta\chi^2$ . Yet, these studies have shown that the  $\Delta\chi^2$  is just as susceptible to the impact of sample size as the  $\chi^2$ . Hence, Chen has shown the use of  $\Delta$ CFI and  $\Delta$ RMSEA that are not as sensitive to sample size as an appropriate alternative to the  $\Delta\chi^2$ . In our case where our sample size is unequal Chen has shown that a change of  $\geq -.005$  in the CFI and  $\geq .01$  in the RMSEA would indicate lack of invariance. These criteria were used for model comparisons in our study.



**Table 1.** Fit indices for confirmatory factor analysis tests of configural invariance and alternative models.

Model	Males					Females				
	$\chi^2$	df	TLI	CFI	RMSEA	$\chi^2$	df	TLI	CFI	RMSEA
Nonhierarchical	883.61	224	.90	.92	.06	933.50	224	.90	.92	.06
Hierarchical	958.12	238	.90	.91	.06	984.38	238	.90	.91	.06

## Results

### *Descriptive statistics*

Of an estimated 2048 children of 11–12 years living in the study areas, 1784 (87.1%) were able to be contacted. Of these, 1720 children participated in the study. This paper is confined to the 1171 (68.0%), whose parents also participated and provided family resource data, obtained from a comprehensive socio-economic questionnaire. The mean age of children in this study was  $11.7 \pm .3$ ; that of children without parental participation was  $11.9 \pm .3$  ( $p < .001$ ). The difference, though statistically significant, has a small effect size and is reflective of the high power the large sample size afforded. Thus it is of no practical significance. Males formed 48% and females 52% in both groups.

### *Preliminary test of assumptions*

#### *Data assumption*

Because our data did not meet criteria for normality (i.e. skewness and kurtosis), a bootstrapping procedure was conducted prior to each set of analyses, where multiple (i.e. 200 bootstrap) samples were extracted from the data and used in the estimate of the populations' sampling distributions.

#### *Testing for measurement invariance*

Table 1 shows that CFAs conducted on males and females considered separately yielded good data to model fit for both hierarchical and nonhierarchical models. Intriguingly, the  $\Delta$ CFI calculated from the results presented in Table 1 shows that the nonhierarchical model might fit the data best for both groups considered separately but the RMSEA values for both boys and girls were identical for both hierarchical and nonhierarchical models. With a  $\chi^2(476) = 1942.56$ , TLI = .90, CFI = .91, and RMSEA = .04, the multigroup unconstrained hierarchical measurement model, where pathways for boys and girls were estimated freely showed good data to model fit. Similar incremental and absolute fit indices were evident for the constrained model. Metric invariance was evident for both hierarchical and nonhierarchical models  $\Delta$  TLI = .00, and RMSEA = .0)

### *Structural equation modelling*

#### *Proposed model vs. alternate model*

As indicated above, the evidence for a better fitting hierarchical measurement model (i.e. for violence) than nonhierarchical model, is equivocal. Hence, we treated the hierarchical model as the model of focus and the nonhierarchical as a competing model. With all paths between endogenous and exogenous variables unconstrained, we tested the model in Figure 1

and compared it with the nonhierarchical model. The fit indices for the hierarchical model are  $\chi^2(476) = 1942.56$ , TLI = .90, CFI = .92, and RMSEA = .04. Since the nonhierarchical model's indices were  $\chi^2(464) = 2364.25$ , TLI = .87, CFI = .92, and RMSEA = .05, there was evidence that the data fit the hierarchical model best. All further analyses were conducted on the hierarchical model.

### **Final model**

We took the subtractive approach recommended by Shoemaker and Lomax (2016), where we included all possible paths in a non-recursive model. Next we tested the unconstrained model across boys and girls. We removed all paths that were nonsignificant for boys and girls. If paths were significant for only one of the two groups or across both groups, they were retained. The path between violence and achievement was nonsignificant for both males and females. Indeed, for males the path had a standardised regression weight of 0 and for females it was .01. This path was thus removed from the model. Fit indices with this path left in the model and removed were identical and thus showed no evidence of model deterioration emerging from its removal.

### **Invariance of pathways for boys vs. girls**

To test for invariance of pathways from endogenous to exogenous, variables were constrained across boys vs. girls. Testing of this model revealed the following four fit indices:  $\chi^2(487) = 1953.66$ , TLI = .90, CFI = .91 and RMSEA = .04. There was a .01-point difference in the constrained CFI, findings that might suggest the lack of invariance in one or more paths. Hence each pathway was constrained iteratively. No differences in the CFI and RMSEA were found for each iteratively constrained path when we compared them with such indices from the unconstrained model.

### **Direct effects**

Figures 2 and 3 show that for both genders, although the first order latent variables domestic violence and school related violence had respectable loadings on the second order Violence latent variable, community based violence and violence inflicted on children in the home had the highest loadings on the second order Violence. These two first order factors accounted for the highest amount of variance in the second order factor.

For the trimmed model, the paths from Violence to IQ were significant for both girls and boys, and the paths from Violence to Achievement were nonsignificant for both. The path from Violence to Behavioural Risk was significant for boys, but not for girls.

Additionally, all paths from the exogenous Family Resources variable to Achievement ( $p < .01$ ), IQ ( $p < .001$ ) and Violence ( $p < .001$ ) were significant for boys ( $p < .001$ ). Similar findings were evident for each of the respective paths for girls ( $p = .007$  and  $< .001$ ). The path from Family Resources to Behavioural Risk factors was significant for boys ( $p < .001$ ) it was not significant for girls. Moreover, all other paths, but that from Behavioural Risk Factors to Achievement in the trimmed model, were significant for boys.

### **Indirect, and mediated effects for boys and girls**

Family Resources had a significant negative direct association with Achievement for both genders. This negative effect on achievement was mediated by a significant indirect and relatively large positive effect through IQ for both boys and girls (i.e. .72 for boys and .65 for

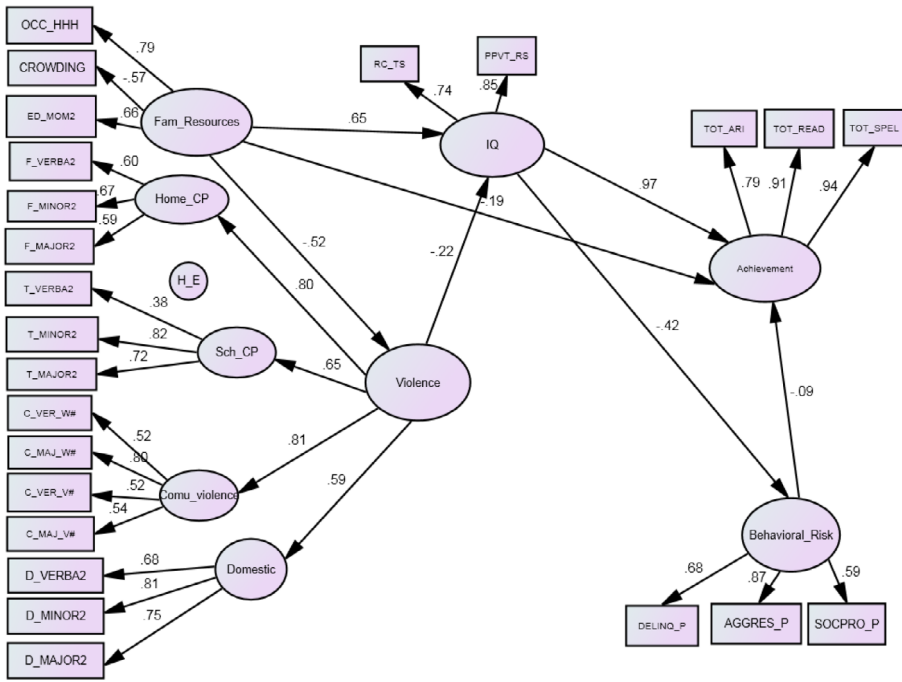


Figure 2. Final model for girls.

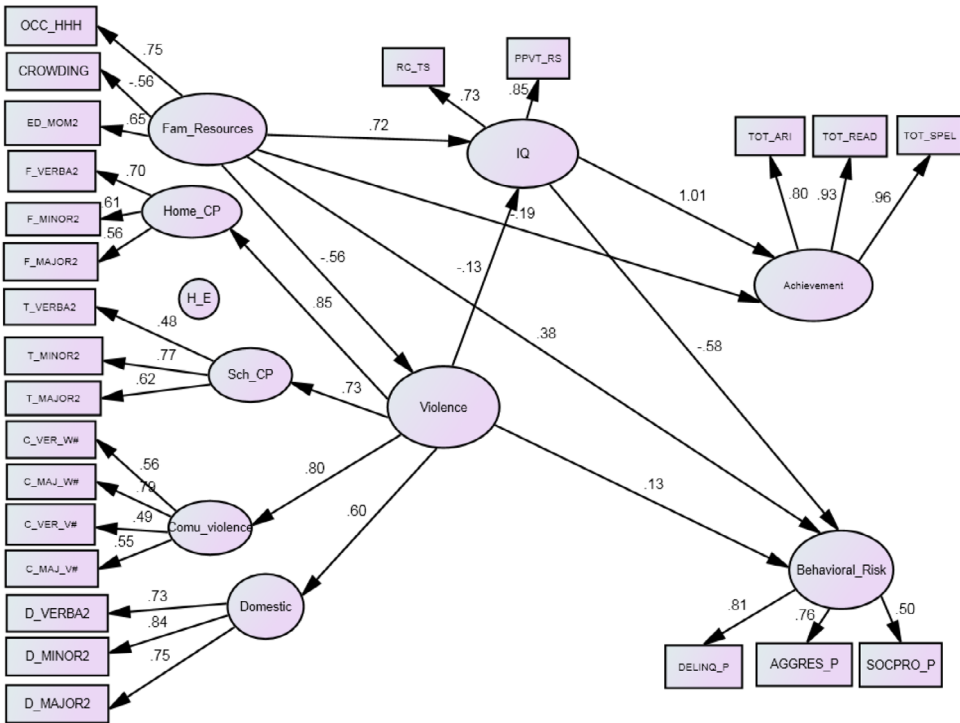


Figure 3. Final model for boys.

girls). The highly significant association between Family Resources and IQ was mediated by a positive significant indirect pathway through Violence. The direct path from Violence to Behavioral Risk is significant for boys only, but part of the variance is mediated by a negative indirect pathway through IQ. Only the indirect pathway is significant for girls.

## Discussion

Using a hierarchical model for polyvictimization, as measured by the latent variable Violence, this study revealed a set of complex pathways to child adjustment following exposure to violence, as measured by Behavioural Risk, IQ and Academic Achievement latent variables.

The direct negative impact of violence on IQ shows that Jamaican boys and girls who have suffered such victimization are at increased risk for compromised intellectual functioning as measured by the Ravens and PPVT. Exposure to violence does not directly impact children's school achievement, but it indirectly impacts achievement through suppressing intellectual functioning. This suggests that children exposed to violence are unlikely to develop their full intellectual potential, and this in turn suppresses academic achievement.

In high income countries, impairment in intellectual functioning and academic achievement has been associated with exposure to violence (Gilbert et al., 2009; Jonson-Reid et al., 2004; Lansford et al., 2002). Impairment in academic functioning has been so marked, that almost a quarter of maltreated children (24%) in the USA received special education, compared with 14% who had not experienced maltreatment.

The significant negative association between family resources and violence suggest that children from the lowest socio-economic (SES) groups are more likely to be exposed to polyvictimization, and therefore its effects, than their higher SES peers. This more complex model supports earlier findings of a greater likelihood of Jamaican children of lower SES being at risk of individual exposures of witnessing community violence, and experiencing violence at home and school (Samms-Vaughan et al., 2005; Samms-Vaughan, *in press*). This finding is concerning as children who are at socio-economic disadvantage are those for whom intellectual functioning and educational advancement present the greatest opportunity for improving their own socio-economic status.

Exposure to violence has a direct association with disruptive behaviour for boys only. For girls, there is no direct effect, but there is an indirect effect mediated by IQ. The direct effect of violence on behavioural risk factors for boys but not for girls is worthy of note. This suggests that in terms of behaviour, boys are more susceptible to the effects of polyvictimisation than girls. Boys are documented to be more susceptible to the effects of the development of severe behavioural and emotional problems, such as conduct disorder, oppositional defiant disorder and ADHD (DSM5, 2013).

The negative association between family resources and achievement is intriguing. At first blush this finding seems counterintuitive. Yet it might be true that children from higher SES families might feel less motivated to invest as much energy into academic achievement as their lower SES peers who might view academic achievement as the primary step toward upward mobility.

For LMICs like Jamaica, where there are high levels of exposure to violence, the intellectual, academic and behavioural associations with childhood exposure to violence have significant implications. Suppression of intellectual functioning in large numbers of children

may require the development of extensive educational support systems, at great additional cost to education systems. Additionally, large numbers of children, and particularly boys in our study, with behaviour related to violence exposure, may require intervention such as trauma focused cognitive behaviour therapy (TF-CBT). TF-CBT has been shown to be useful in reducing the impact of violence on some children (Cohen, Deblinger, & Mannarino, 2016). While effective, this is an expensive form of therapy, typically delivered individually by highly trained mental health professionals, which is often not available in LMICs. If available, it is often not accessible or affordable to large numbers of children living in LMICs.

In the absence of intervention, impaired academic functioning and higher levels of disruptive behaviours in large numbers of children may translate in the future to an under-educated society with high proportions of persons with antisocial behaviour. Together these will necessarily impede developmental advancement of a country. The interventions to address the consequences of exposure to violence, including remedial education and specialist mental health therapy for large numbers of persons, are costly, and are often not affordable within the limited financial resources of LMICs.

Prevention of childhood exposure to violence is therefore the most feasible option for LMICs and probably also for HICs. This research provides evidence that could be used to inform policy and practice decisions to reduce exposure to polyvictimisation and possibly reduce, if not remove, most of its effects on young adolescent adjustment. For example, reduction of exposure to violence at school and at home could be addressed by legislation to ban corporal punishment, supported by public education on non-violent forms of discipline. Addressing exposure to community violence is more complex given the social contributors. However, public education in communities on the impact of community violence on children may be useful.

## Ethical Approval

Ethical approval was received from the University of the West Indies, Faculty of Medical Sciences Ethics Committee.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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