



## Research article

## How stressful life events and violence are related to mental health: the protective role of social relations in African context

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## ABSTRACT

Adolescents are universally expected to be at risk for heightened stress and violence, and subsequently to mental health problems. Good social relationships may protect their mental health, but research has mainly focused on singular relations, such as peer popularity or general social support. The current study analyses the buffering role of multiple relationships in an African context. First, how stressful life-events and violent experiences are associated to mental health, and, second, whether good social relationships with parents, siblings and peers can buffer mental health from stress and violence. The participants were 415 Ghanaian students (aged 14–17 years,  $M = 16.51$ ; 71% girls). They indicated mental health by depressive symptoms and psychological distress and reported the quality of parental (support and control), sibling (warmth and rivalry) and peer relationships, and exposure to stressful life-events and violence. Hierarchical linear regression models with main and interaction effects were used to analyze the data. Only stressful life-events, but not violence, were associated with higher levels of depressive and psychological distress symptoms. Positive sibling relationships played a buffering mental health role, as stressful life-events were not related with increased depressive symptoms among adolescents enjoying warm and intimate siblingships. No protective function was found for parental or peer relationships, although good maternal and peer relationships were associated with lower levels of depressive symptoms in general.

## 1. Introduction

Adolescents meet tremendous changes involving both opportunities for growth and high stress. The period is characterized by a drive for independence and increased salience of peer interactions in tandem with intensive physiological maturation and brain development (Allemand et al., 2015; Blakemore and Mills, 2014; Kilford et al., 2016). Adolescents face multiple pressures, difficulties, and challenges, incorporated in stressful life-events, and are at risk for community violence, all detrimental to their mental health and wellbeing (Foster and Brooks-Gunn, 2015; Stansfeld et al., 2017; Sui et al., 2018). In adolescence, peers, friendships, and intimate relationships become especially salient, although family ties are still important (Crone and Dahl, 2012). According to buffering theories of social support, good and trustful social relationships can help adolescents maintain good mental health in stressful and violent conditions (Thoits, 1982). The buffering role of supportive social relations in facing stress are considered universal, but research is mainly available from Western countries (Nurullah, 2012; Washington et al., 2017). This study extends our knowledge into potential buffering roles of family and peer relations in African contexts.

The participants are Ghanaian adolescents, and the study analyzes how experiences of stress and violence influence their mental health, and whether multiple good social relationships can play a buffering role.

## 1.1. Stress and adolescent mental health

Adolescents confront a myriad of stressful life-events due to the intensive changes, growth, and multiple demands of their developmental period. Normative events become stressful if they threaten, challenge, or exceed adolescents' social, psychological, and physiological capacities and resources (Grant et al., 2003). Non-normative events are often unpredictable, and they can dramatically change adolescents' life course, comprising such events as parental divorce, death or illness of a close person, or economic deprivation (Grant et al., 2003; Suldo et al., 2008). A meta-analysis established that severe or multiple stressful life-events lead to increased levels of depression among adolescents (Li et al., 2016).

Multiple studies covering different cultures and regions show that parental divorce exacerbates developmental challenges and can lead to mental health problems. A 14-year-longitudinal Australian cohort study found that adolescents with a history of parental divorce showed 1.6

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times more risk for depressive episodes than those from intact families (Patton et al., 2014). An American study confirmed that parental divorce in early childhood predicted depressive symptoms in adolescence (Ge et al., 2006). Cross-sectional studies show similarly that family disruptions are highly stressful for adolescents, and that divorce forms a risk for depressive and anxiety symptoms, as well as for substance and alcohol abuse (Jackson et al., 2016; Low et al., 2012; Størksen et al., 2005). However, a qualitative research among Israeli adolescents found more nuanced responses to parental divorce. Only for a part of adolescents did divorce indicate vulnerability and mental health problems, while others perceived the experience as a source of empowerment and resilience that had taught them effective coping strategies to face future stressors (Eldar-Avidan et al., 2009). Also, research in African contexts emphasizes the importance of adolescents' responses and meaning making about divorce, as well as family supports modulating the ways of parental divorce influences wellbeing (Bojuwoye and Akpan, 2009; Mashego and Taruvinga, 2014).

The loss of a family member is a highly stressful experience in any phase of development, and research confirms that bereaved adolescents are highly vulnerable to mental health problems, especially depression (Spuij et al., 2012). A prospective European study revealed that family-bereaved adolescents reported higher levels of anxiety, depressive, and aggressive symptoms than their non-bereaved peers (Stikkelbroek et al., 2016). Young adults who experienced death of their parent in childhood had an increased risk of psychiatric disorders, especially major in a study based on Swedish national cohort (Berg et al., 2016).

Adolescents in economically deprived families and with own economic problems are at heightened risk for mental health problems. The classic studies on adolescents' efforts to cope with family income loss are from the 1928 economic recession (Conger and Elder, 1994) and later economic upheavals in USA (Evans and Kim, 2013; Stein et al., 2013). Adolescents growing up in persistent economic deprivation, poverty, and economic injustice may confront multiple stressors such as famine, toxic living environments, separations, and family turmoil, as well as lack of educational opportunities, which form risks for depression, substance abuse, and antisocial behaviours (Evans and Kim, 2013). A systematic review of 31 studies of African American adolescents confirmed a significant association between low socioeconomic status and depression and anxiety symptoms (Washington et al., 2017). Concerning the African context, however, a study among Ugandan adolescents did not find a significant association between socio-economic deprivation (poor housing conditions and low family income) and depression (Kinyanda et al., 2013).

### 1.2. Violence and adolescent mental health

Research points to severe consequences of violence on adolescent mental health, including depression and suicidal behaviour. Meta-analyses confirm that domestic and community violence can increase the risk for suicide ideation and attempts, although with modest effect sizes in Western countries (Castellví et al., 2017; Wilson and Rosenthal, 2003). In the African context, a study of Ethiopian college students revealed that witnessing parental violence as a child increased the risk for depression, lower self-esteem, and suicidal ideation (Nicodimos et al., 2009). Personal experiences of domestic violence formed a risk for depressive disorder among Ugandan children living in a poor and disadvantaged community (Kinyanda et al., 2013).

There is some evidence that interpersonal violence at home is more devastating in terms of anxiety, depression, and posttraumatic stress disorder (PTSD) than more anonymous violence in the community (Ismayilova et al., 2016; Mrug et al., 2008; Mrug and Windle, 2010; Skeen et al., 2016). However, a South-African study argued that witnessing both community and domestic violence, especially that involving sexual assault, heightens the risk for depression, aggression, and antisocial behaviour (Sui et al., 2018). Further African studies confirm that numerous violent experiences (physical, emotional, and sexual violence

from adults and peers) are associated with depression, anxiety, and suicide ideation (Gust et al., 2017; Nkuba et al., 2018). The severity of sexual or physical violence, whether domestic or community-related, appears to form a severe mental health risk for adolescents.

### 1.3. The role of social relationships in adolescence

Adolescents establish strong connections with their peers, while becoming increasingly autonomous from their parents and family. Yet, societies and cultures differ in the degree of autonomy they give to and demand from adolescents (Chen, 2012; Kagitcibasi, 2005). While Western societies value individuation and encourage personal choice, many other societies and cultures, including West African, emphasize respect for elders, social obligations, responsibilities, obedience, and conformity (Greenfield et al., 2003).

Research provides evidence that good family relations can be highly beneficial for adolescents' mental health. A meta-analysis among African American adolescent indicated that supportive parenting practices, healthy family functioning, and safe family environments protected mental health from the negative stress impacts, indicated by lower levels of depression and anxiety symptom despite high exposure to stress (Washington et al., 2017). For instance, a longitudinal study found out that maternal support helped reduce the risk of depressive symptoms among adolescents exposed to poverty and domestic and community violence (Eisman et al., 2015). In the European context, a study confirmed that exposure to school violence did not deteriorate adolescents' mental health if pupils enjoyed good social support from their parents (Duru and Balkis, 2018). Concerning the direct effects of good parenting, a longitudinal study in Ghana confirmed that parental warmth and support associated with low depressiveness across adolescence (Roche et al., 2016).

Warm, nurturant, and close sibling relationships have beneficial influences on children's social competence, ability to resolve conflicts, and emotion regulation skills (Desha et al., 2011; Vogt-Yuan, 2009). Good siblingship promotes good mental health, too, but research is scarce on a protective function when facing stress and violence. A meta-analysis revealed that a high level of siblingship warmth, as well as low levels of conflict and differential treatment by parents, were associated with lower levels of anxiety, depression, and aggression among adolescents (Buist et al., 2013). Similarly, African American adolescents who enjoyed warm and positive sibling relationships showed decreased levels of depressive and anxiety symptoms and increased level of self-worth (Kumar et al., 2015; Whiteman et al., 2015), whereas low sibling support and high sibling conflict were associated with high depression and anxiety among Dutch and Moroccan adolescents (Buist et al., 2014). Only a few studies provide evidence for the protective mental health role of warm and supportive siblingship in conditions of stress (Eisman et al., 2015; Overstreet et al., 1999) and violence (Peltonen et al., 2010).

Adolescents rely increasingly on their peers for support, advice, and approval. Research confirms that good friendships increase adolescent well-being, life-satisfaction, happiness, and psychosocial adjustment (Raboteg-Saric and Sakic, 2014), and supportive peer relationships result in lower risk of depressive symptoms (Luo et al., 2017; Pachucki et al., 2015). Importantly, a study on school violence found that when parental support is absent, support from peers and friends moderated the impact of violence on adolescents' anxiety, depression and somatic symptoms (Duru and Balkis, 2018).

On the negative side, peer rejection, bullying and conflicts in peer relations are highly stressful and even traumatic for adolescents (Beeri and Lev-Wiesel, 2012; Morrow et al., 2008; Platt et al., 2013; Wu et al., 2015; Zimmer-Gembeck et al., 2014). However, in a Finnish study, peer rejection was not causally linked with depressive and anxiety symptoms (Sentse et al., 2017).

In addition to direct links, there is some evidence that supportive and caring peer relationships can play a protective mental health role in stressful conditions (Zhang et al., 2013). A longitudinal European study

confirmed that high quality peer relations and friendships reduced depressive symptoms among adolescents experiencing stressful life-events of family adversity and school bullying (van Harmelen et al., 2016). Findings among African American adolescents showed that good peer support could protect them from risks of suicidality and depression (Matlin et al., 2011).

#### 1.4. Aims of the study

Stressful life-events and violence in adolescence are known to harm mental health, but supportive social relations can have buffering functions. The current study extends research on such functions into the African context, and to the potentially different impacts and protective roles family (parent and sibling) and peer relationships may have for adolescent mental health. First, it examines how stressful life-events (including family losses, poverty, and illnesses) and violence (physical assaults and threats) are related with mental health problems of depressive and psychological distress symptoms. The hypothesis was that adolescents reporting high levels of stressful life-events and violent experiences would show a higher level of depressive symptoms and psychological distress (emotional, behavior, relational and hyperactivity problems) than those reporting fewer such events. Second, the study tests whether parental, sibling and peer relationships can protect adolescents' mental health from the adverse impact of stressful life-events and violent experiences. The hypotheses were that when adolescents enjoy supportive parental relationships, functional peer relationships, and good siblingships, high levels of stressful life-events and violent experiences do not associate with depressive and psychological distress symptoms.

## 2. Method

### 2.1. Participants and procedure

A group of 415 Ghanaian students (boys 28.9% and girls 71.1%), aged 14–17 ( $M = 16.51$ ,  $SD = 0.76$ ) participated in the study. Ghana is divided into sixteen administrative regions and subdivided into 228 districts. The vast majority of state-owned senior high schools in Ghana operate the boarding school system. The two public funded senior high schools from the Ashanti Akim central municipal district of Ghana where majority of students live in safe traditional boarding houses on campus was chosen for this study. It was chosen based on accessibility, time, resources, and high ethnic diversity. The sample reflect the multicultural diversity of Ghanaian society, as the participants represent the main ethnic groups of the country, namely Akan, Ga-Adangbe and Mole Dagbani.

The study procedures and measures were reviewed and ethically approved by Ghana Education Service (Ref. No. 14/19/11). Permission to conduct the study at the schools was further obtained from the regional Ghana Education Service at Kumasi. The researcher and class teachers administrated the self-report questionnaires during mid-afternoon classes, around the second term of the last academic year. The students were duly informed about the purpose of the research, the study procedures, risks involved and benefits of the study. The informed consent emphasized that the participation in the study was voluntary and all responses to the questionnaire would remain confidential. The students assented their willingness to participate in the study. Due to the boarding school setting, the headmasters of both schools acting as a legal guardian on behalf of the students' parents undersigned the informed consent. The choice was based on agreement with parents who had entrusted their children's protection and welfare to the school administrators.

### 2.2. Measures

#### 2.2.1. Stressful life-events

To measure stress, the 30-item Multidimensional Scale of Stressful Life-events (Newcomb et al., 1981) was applied. It covers domains of

family, school and society, and includes experiences of losses, financial difficulties, and encounters with the law. Adolescents reported whether they experienced each item during the last three months. A sum variable was formed, with a higher number indicating higher exposure.

#### 2.2.2. Violent experiences

To indicate violence, the 10-item Adolescent Exposure to Violence checklist (Singer et al., 1995) was applied. It includes experiences such as threats, knife attacks, and shootings. Participants reported whether they had experienced each during the last three months. A sum variable was formed, with a higher number indicating higher exposure.

#### 2.2.3. Depressive symptoms

The Birlson Depression Self-Rating Scale for Children was used to assess adolescents' depressive symptoms (Birlson et al., 1987). The 18-item instrument covers the affective, behavioural, and cognitive dimensions of depression. Adolescents responded on a 3-point Likert scale (0 = *never*, 1 = *sometimes*, 2 = *mostly*) how often they had experienced the described symptoms during the last month. A sum variable was constructed after omitting one item due to low correlation, and a moderate Cronbach's alpha (.60) was reached. This scale has been validated in African context (Kaiser et al., 2019).

#### 2.2.4. Psychological distress

The 25 item Strengths and Difficulties Questionnaire (adolescent version SDQ, Goodman, 1997) was used to assess emotional, behavioral, and relational problems, hyperactivity, and prosocial behaviour. These five dimensions consists of five items, 25. The adolescents evaluated on a 3-point Likert scale how well descriptions fit them (0 = *not true*, 1 = *somewhat true*, 2 = *yes, fits well*). A sum variable of psychological distress was constructed by summing the four symptom subscales, excluding prosocial behaviour, with Cronbach's alpha of .70. The SDQ scale is validated in the Ghanaian context (Asante et al., 2015; Doku, 2016).

#### 2.2.5. Sibling relations

The 11-item Sibling Relations Questionnaire (SRQ, Dunn et al., 1994) was used to evaluate positive (warm and intimacy) and negative (conflict and rivalry) interactions with siblings. Example questions for the subscales are "We usually laugh and joke together" (warmth), "I usually tell him/her about my secrets" (intimacy), "He/she annoys and teases me" (conflict), "I feel jealous of him/her when he/she takes all my mother's attention" (rivalry). For each of the items, participants respond using a 5-point scale ranging from 1 (*never*) to 5 (*always*). The negative items were reverse scored, and a total sum variable was calculated, with Cronbach's alpha of .71.

#### 2.2.6. Peer relationships

The 17-item Rank Style with Peers Questionnaire (RSPQ; Zuroff et al., 2010) was applied to assess the style of peer relationships. The scale measures preferred strategies for pursuing, defending, and relinquishing social rank among peers, consisting of three factors: *Dominant leadership* (e.g., "I often take initiative and make suggestions"), *Coalition building* (e.g., "I value teamwork") and *Ruthless self-advancement* (e.g., "An ambitious person cannot afford excessive loyalty to others"). Adolescents evaluated on a Likert scale ranging from 1 (*not at all like me*) to 5 (*very much like me*) how well the descriptions fit them. After reversing negative items, a sum variable was constructed, with higher scores indicating optimal peer relationships, and Cronbach's alpha of .90.

#### 2.2.7. Parental relationships

The 18-item Multicultural Parenting Scale by Barber et al. (2005) covers parental support and psychological control. Psychological control involves insensitive and manipulative practices (8 items, e.g., "Blames me for other family members' problems"), and supportive caring parenting and showing interest (8 items, e.g., "Cheers me up when I'm upset"). Adolescents were asked to estimate separately how well the

items describe their mothers and fathers on 3-point scale (from 1 = *not like him/her* to 3 = *a lot like him/her*). The items of insensitive and manipulative practices were first reverse scored, and then separate sum variables with higher values indicated more positive relationships were formed for both parents. Cronbach's alpha was .85 for mothers and .74 for fathers. The scale has been validated also in African countries (Barber and Xia, 2013).

2.3. Statistical analyses

We initially examined associations between violent experiences and stressful events, social relationships, and mental health by bivariate correlations. We then constructed linear ordinary least squares regression models hierarchically, separate for psychological distress and depression.

Table 1. Demographic characteristics of the sample.

	%	
<b>Place of residence</b>		
City	40	166
Town	60	249
<b>Ethnic Origin</b>		
Akan	74.7	310
Ewe	12.8	53
Ga-Adangbe	3.6	15
Mole-Dagbani	8.9	37
<b>Disability</b>		
Yes	2.7	11
No	97.3	404
<b>Mother's Education</b>		
No Education	6.5	27
Primary School	11.6	48
Middle School	32.5	135
Secondary School	29.4	122
University	13.3	55
I don't Know	6.7	28
<b>Father's Education</b>		
No Education	3.6	15
Primary School	6.3	26
Middle School	21.0	87
Secondary School	33.5	139
University	27.0	112
I don't Know	8.7	36
<b>Family Order</b>		
I am the only child	1.2	5
I am the first child	26.3	109
I am the second child	24.8	103
I am the third child	21.7	90
<b>Family structure</b>		
Single mother	31.8	122
Single father	5.8	24
Two parent family	53.0	220
Other	9.4	39
<b>Absence School</b>		
I haven't been absent from School	63.9	265
Not doing my homework	1.2	5
Harassed by other children in School	1.7	7
Harassed by teachers	1.9	8
The school day is too long	6.0	25
<b>School Performance</b>		
Below	2.9	12
Average	47.0	196
Above	50.1	208

We added gender and age to the models at Step 1, because gender correlated with independent (violent experiences) and dependent (depressive symptoms) variables, and age for theoretical reasons (transition from family relationship to peer and friend relationship; Crone and Dahl, 2012; Kilford et al., 2016). At Step 2, we added stressful life-events and violent experiences, at Step 3 the social relations variables, and at the final Step 4, the interactive effects of violent and stressful experiences with different types of social relations.

We assessed the unique predictive power of violent experiences and stressful events when both were included in the regression models based on Step 2 models. The possible protective or other moderating effects of social relations on the relationship between violent experiences or stressful events and mental health were assessed based on Step 4 models. Where moderating effects were found, we plotted simple slopes at one standard deviation above and one standard deviation below mean levels of the moderating variables to aid interpretation. Above the mean was considered as good and below the mean as poor relations.

We assessed improvements in model fit at each step by the statistical significance of changes in R<sup>2</sup> and F, and final parameter estimates were based on the last step that improved the fit of the model. We report the predictive power of the final model as the share of variance in the dependent variable explained, R<sup>2</sup>. IBM SPSS Statistics 23 was used for all analyses.

3. Results

3.1. Descriptive statistics

As Table 1 indicates, the sample covered the main ethnic groups of Ghana, Akan, Ewe, Ga-Adangbe and Mole Dagbani. Of fathers about a quarter (27%) and 13% of mothers had a university education. Almost three quarters (71%) of fathers worked in the informal sector, for instance, as farmers, traders, food processors, artisans and craft-workers. Most mothers (87%) also worked in the informal sector. About a half (53%) of adolescents had families with both parents, a third single-parent families (38%), and 9% lived with their grandparents. A fifth (22%) reported five or more siblings.

The means, standard deviations, and correlations between study variables are in Table 2. Adolescents reported an average of 2.17 violent events (SD = 2.23) out of a maximum of ten and 6.52 stressful life events (SD = 5.06) out of a maximum of thirty. Reflecting the community nature of the sample, overall levels of depressive symptoms (M = 12.83, SD = 3.93, range 4–25, theoretical range of measure 0–34) and psychological distress (M = 12.26, SD = 5.49, range 1–28, theoretical range of measure 0–40) may be described as low to moderate.

Both stressful life-events and violent experiences positively correlated with depressive symptoms and psychological distress, and negatively with supportive parental relationships. Depressive symptoms and psychological distress in turn correlated negatively with supportive parental and optimal peer relationships.

3.2. Stress, violence, and mental health

The hierarchical regression analyses are presented for depressive symptoms in Table 3 and for psychological distress in Table 4. As stated in our first hypothesis, a high level of stressful life-events were associated with high levels of depressive symptoms (β = 0.25, t = 4.62, p < .001; Table 3, Model 2) and psychological distress (β = 0.35, t = 6.79, p < .001; Table 4, Model 2). Yet, against the hypothesis, violent experiences did not significantly associate with either depressive symptoms or psychological distress, when they were included in regression models together with stressful life-events. Considering demographic factors, girls reported significantly more both depressive symptoms (β = 0.19, t = 3.82, p < .001) and psychological distress (β = 0.11, t = 2.28, p < .001).

**Table 2.** Bivariate correlations between background variables, mental health, life experiences and social relations among Ghanaian youth.

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Age	16.52	.76	1								
2. Gender			.07	1							
3. Depression	1.71	.22	.02	.18**	1						
4. Psychological distress	12.26	5.49	.05	.09	.48**	1					
5. Violence Experience	2.17	2.23	.04	-.26**	.11*	.20**	1				
6. Stressful life Events	6.52	5.06	.08	-.01	.26**	.38**	.48**	1			
7. Sibling Relations	29.46	7.11	.00	.01	-.16**	-.04	.06	-.08	1		
8. Peer Relations	65.00	12.90	.06	.01	-.22**	-.24**	-.08	-.25**	.24**	1	
9. Relations with Mother	42.82	5.95	-.01	-.02	-.28**	-.24**	-.14**	-.24**	.08	.22**	1
10. Relation with Father	39.69	7.15	.07	.09	-.24**	-.32**	-.13*	-.31**	.10*	.23**	.36**

Note:  $N = 415$ . Means (M) and standard deviations (SD). \* $p < .05$ , \*\* $p < .01$ .

### 3.3. Buffering role of social relationships

Concerning depressive symptoms, the results show significant interaction effects between stressful life-events and sibling relationships ( $\beta = -0.14$ ,  $t = -2.36$ ,  $p = .019$ ; Table 3, Model 4) and peer relationships ( $\beta = 0.12$ ,  $t = 2.10$ ,  $p = .036$ ; Table 3, Model 4), as well as between violent experiences and sibling relationships ( $\beta = 0.20$ ,  $t = 3.57$ ,  $p < .001$ ; Table 3, Model 4). Yet, only good siblingships played a buffering role concerning depressive symptoms, as illustrated in Figure 1. As hypothesized, a high level of stressful life-events was not associated with high levels of depressive symptoms among adolescents who enjoyed good siblingships, whereas stressful life-events were associated with depressive symptoms among adolescents with poor sibling relationships.

The significant interaction effect between stressful life-events and peer relationships in Figure 2 reveals that only when adolescents were exposed to a low level of stressful life-events, were good peer relationships associated with a low level of depressive symptoms. The good relationships could not buffer adolescent mental health when stressful life-events increased.

Similarly, Figure 3 shows that only when exposed to a low level of violent experiences, were good siblingships associated with a low level of depressive symptoms. They did not have a buffering function when violent experiences increased.

Results did not show any significant stress/violence and social relationships interaction effects on psychological distress (Table 4, Model 4). Thus, against our hypothesis, adolescents' good parental, sibling or peer relationships could not buffer them from the negative impact of stress and violence on psychological distress.

Interestingly, the significant main effects of social relations show that supportive relationship with mother ( $\beta = -0.17$ ,  $t = 3.42$ ,  $p = .001$ ) and good peer relationships ( $\beta = -0.12$ ,  $t = -2.39$ ,  $p = .017$ ) were associated with a lower level of depressive symptoms (Table 3, Model 4). Meanwhile, supportive relationship with father ( $\beta = -0.19$ ,  $t = -3.78$ ,  $p < .001$ ) and, again, optimal peer relationships ( $\beta = -0.13$ ,  $t = -2.52$ ,  $p = .012$ ) were associated with a lower level of psychological distress (Table 4, Model 4).

## 4. Discussion

This study examined how stressful life-events and violent experiences associate with mental health among adolescents, and whether good social relationships can buffer their mental health. Consistent with our hypothesis, stressful life-events were associated with higher levels of symptoms of depression and psychological distress, whereas, against the hypothesis, violent experiences did not form a similar unique risk for adolescents' mental health. The buffering function of social relations seemed to be symptom- and relationship specific, as stressful life-events were not associated with depressive symptoms only among those adolescents who enjoyed warm and intimate sibling relations. Instead, good

parental or peer relationships did not protect adolescent mental health from stress or violence, although supportive relationships with father together with good peer relations were associated with low psychological distress symptoms, and supportive relationship with mother together with good peer relationship with fewer depressive symptoms, in general.

### 4.1. Stress, violence, and mental health

The result that stressful life-events associated with mental health symptoms while exposure to violence did not, may seem counterintuitive. Violence could involve dramatic acts like knife attacks and shootings, and stressful life-events related to issues like financial difficulties, divorce, or encounters with the law. These results contradict findings in American (Mrug and Windle, 2010) and African contexts (Kinyanda et al., 2013; Nkuba et al., 2018; Sui et al., 2018) with adolescents exposed to domestic and community violence. Yet, comparisons between mental health consequences of stressful life-events and violent experiences in the same data rare, although studies are available on simultaneous impact of domestic and community violence (Mrug et al., 2008; Skeen et al., 2016). A study among war-affected Middle Eastern children found similarly to ours that everyday life-events formed a more severe risk for depressive and PTSD symptoms than traumatic and violent war events (Diab, 2011).

The seemingly counterintuitive result of stress exceeding violence in negative mental health impacts can be because adolescents collectively face community violence and society-related traumatic events. Poverty, family conflicts, and personal losses, on the other hand, are both painful and shameful, and do not signify possibility to share the upsetting experience with others. Encountering severe violence characterized by shooting or attacks was not very unfamiliar to the participating Ghanaian adolescents, as about a quarter reported something valuable stolen from them and a fifth had heard gun shots in their neighborhood. Yet in Ghana, community violence is not a chronic threat and is not embedded in the everyday environment as it is among some African American adolescents or children living in warzones. It is more likely to be a single-trauma event, which, according to our results did not associate with the increased depressive or psychological distress symptoms, when effects of stressful life-events were simultaneously considered.

There was a significant gender difference in manifestation of mental health problems. Girls reported more psychological distress and depressive symptoms than boys, which has been documented among adults in high, middle-, and low-income countries (Low et al., 2012; Slone et al., 2006), and children in disadvantaged conditions in North America (Nurullah, 2010). Reasons for girls' higher vulnerabilities may relate to the negative impact of societal distinct gender roles that consider females weaker and inferior, girls' greater readiness to recognize and communicate mental distress, or greater exposure to sexual abuse and other adversities (Galvao et al., 2014; MacLean et al., 2013).

4.2. Protective role of social relations

Sibling relationships turned out to be important, whereas parental or peer relationships could not ameliorate the heightened risk caused by stressful life-events on mental health. As hypothesized, a high level of stressful life-events did not associate with increased depressive symptoms when adolescents enjoyed good sibling relations. Apparently, warm, intimate, non-conflicting, and non-rival siblingship could function as a source of care, assurance, and relief when facing stressful life events, which explains their importance for adolescent mental health in times of stress. Supportive siblingship is generally associated with good mental health (Ozer and Weinstein, 2004), but research is scarce about its buffering role among adolescents facing violence. Our findings revealed that good siblingship was associated with low level of depression only when the exposure to violence was low, whereas it was not able to buffer adolescent mental health when exposed to a high degree of violence.

The importance of siblingships as buffering factor in every day stress may reflect African cultural values. It is believed that an individual needs others' support in order to pursue his or her life goals and gain a feeling of belonging. In African family traditions older siblings take up the responsibility of caring for younger ones (Mweru and Murungi, 2013). This is supported by an African proverb which says that "a single hand cannot nurse a child" — the mother has the responsibility of taking care of the child, but the responsibility of transmitting values, socialization goals, and belonging is shared by the whole family and community (Amos, 2013; Mweru, 2017).

Peer relationships, involving interaction style and quality, had a significant main effect on depressive symptoms in general and when adolescents were exposed to a low level of stressful life-events, which is in accordance with prior research (Luo et al., 2017; van Harmelen et al., 2016). However, when stressful life-events were overwhelming, functional peer relationships were not enough to buffer adolescent mental health. Research among war-affected children similarly showed that

Table 3. Hierarchical linear regression models for depressive symptoms among Ghanaian youth.

Predictor	Model 1	Model 2	Model 3	Model 4
Intercept	10.79**	12.63**	10.73**	11.45**
Demographic variables				
Gender (female)	0.17***	0.19***	0.20***	0.18***
Age	0.01	-0.01	0.01	0.003
Life experiences				
Violent experiences		0.04	0.06	0.01
Stressful events		0.25***	0.13*	0.17**
Social relations				
Relations with mother			-0.16**	-0.17**
Relations with father			-0.13*	-0.09
Sibling relations			-0.11*	-0.09
Peer relations			-0.10*	-0.12*
Interaction effects				
Stress X mother				-0.02
Stress X father				0.01
Stress X siblings				-0.14*
Stress X peers				0.12*
Violence X mother				-0.08
Violence X father				-0.02
Violence X siblings				0.20*
Violence X peers				-0.01
R <sup>2</sup>	.03	.10	.19	.23
ΔR <sup>2</sup>	.03	.07	.09	.04
ΔF	6.54**	16.17***	10.93***	2.61**

Note. Fully standardized regression coefficient estimates. N = 415. \*p < .05, \*\*p < .01, \*\*\*p < .001.

Table 4. Hierarchical linear regression models for psychological distress among Ghanaian youth.

Predictor	Model 1	Model 2	Model 3	Model 4
Intercept	6.49	10.18	6.70	6.79
Demographic variables				
Gender (female)	0.09	0.11*	0.13**	0.12*
Age	0.04	0.01	0.04	0.04
Life experiences				
Violent experiences		0.06	0.07	0.07
Stressful events		0.35***	0.24***	0.24***
Social relations				
Relations with mother			-0.08	-0.07
Relations with father			-0.19***	-0.19***
Sibling relations			0.03	0.04
Peer relations			-0.12**	-0.13*
Interaction effects				
Stress X mother				-0.06
Stress X father				-0.02
Stress X siblings				-0.04
Stress X peers				0.03
Violence X mother				0.02
Violence X father				0.02
Violence X siblings				0.06
Violence X peers				-0.003
R <sup>2</sup>	.01	.16	.23	.23
ΔR <sup>2</sup>	.01	.15	.07	.01
ΔF	2.08	35.84***	9.07***	0.39

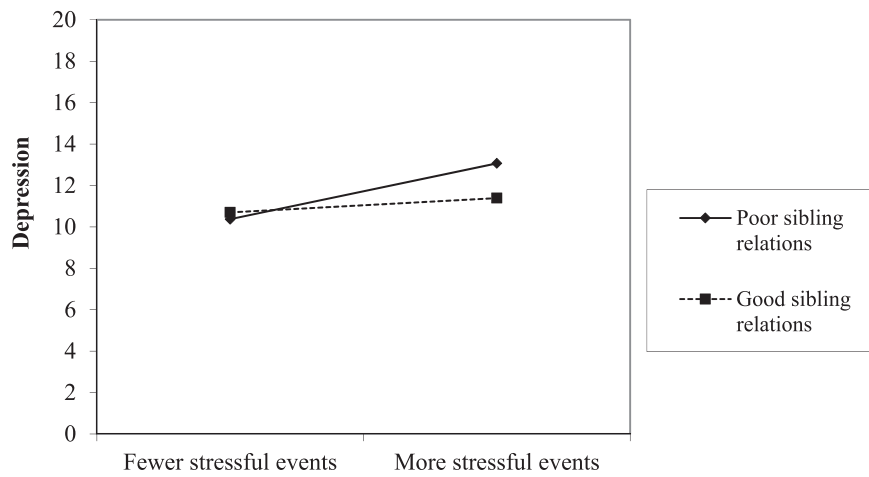
Note. Fully standardized regression coefficient estimates. N = 415. \*p < .05, \*\*p < .01, \*\*\*p < .001.

when exposed to severe trauma, warm and intimate friendships were ineffective in maintain good mental health, although it generally was associated with lower psychological distress and PTSD (Diab et al., 2011; Peltonen et al., 2010). However, good peer relationships contributed to both indicators of adolescent mental health, which accords with ample evidence of beneficial effects of good peer relationships and risks of peer rejection for adolescent mental health (Pachucki et al., 2015; Wu et al., 2015).

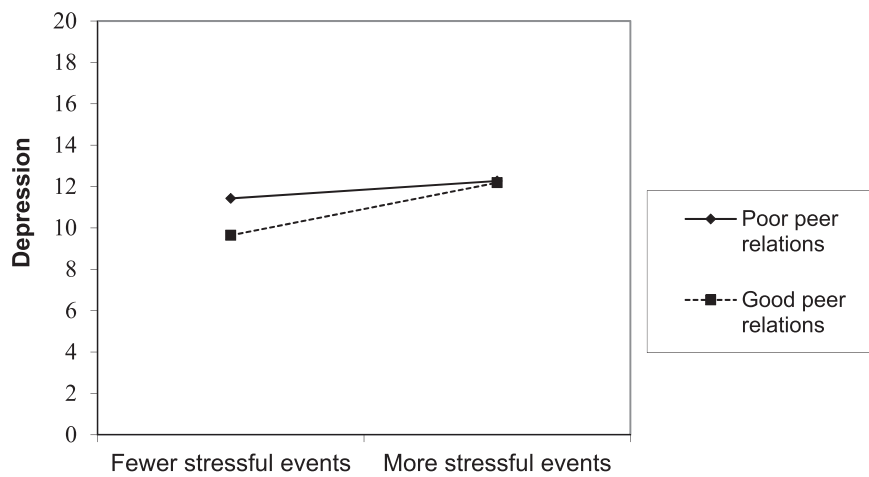
Parental relationship did not have a buffering function against mental health problems when adolescents faced stressful life-events, although supportive relations with the mother were associated with lower depressive symptoms and supportive relations with the father with lower psychological distress in general. This contradicts findings among American adolescents in families facing economic recession and upheavals (Ge et al., 2006; Vaughan et al., 2010) and African American adolescents living in disadvantaged conditions (Eisman et al., 2015). Our result can reflect the African family values and dynamics, where siblings' beneficial role is important.

4.3. Limitations

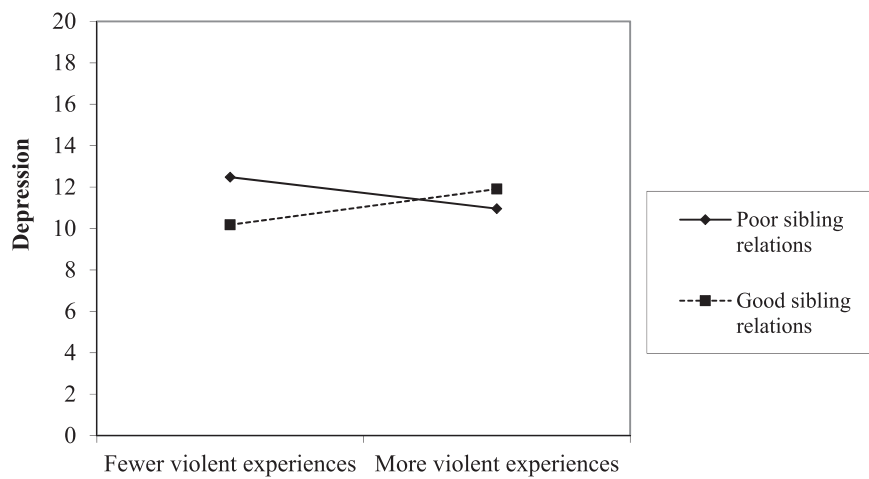
We had a fairly large and representative sample from a rarely studied context, although girls were somewhat over-represented. The fact that all measures were based on self-reports is a severe limitation of the study. The same source of information can lead to biased responses and can influence the results, as the proportion of shared variance between stress and mental health can be large. Future studies should therefore use multiple informants, for instance siblings or peers evaluating the quality of relationships, which would allow a more comprehensive analyses and produce more reliable results. Further, the cross-sectional nature of the study impedes causal interpretations with regard to the direction of the observed associations between stressful life-events and depression and psychological distress.



**Figure 1.** Interaction effect of number of stressful events and quality of sibling relations on depressive symptoms. Slopes drawn from one SD below mean to one SD above mean, for a hypothetical male participant with average scores on all other variables.



**Figure 2.** Interaction effect of number of stressful events and quality of peer relations on depressive symptoms. Slopes drawn from one SD below mean to one SD above mean, for a hypothetical male participant with average scores on all other variables.



**Figure 3.** Interaction effect of violent experiences and quality of sibling relations on depressive symptoms. Slopes drawn from one SD below mean to one SD above mean, for a hypothetical male participant with average scores on all other variables.

## 5. Conclusions

The results of this study indicate that stressful life-events associate with depression and psychological distress. While some events are unavoidable, some, such as school related stress can be tackled with more effective school counselling and targeted help for peer relations. Our findings emphasize the importance of good and intimate siblingship in buffering adolescent mental health in the face of hardships. Together with earlier studies (Diab et al., 2011; Peltonen et al., 2010), it provides important knowledge for government and public health providers in developing social and health policies, which help strengthen social bonds. In big families, typical in Ghana and other African contexts, caring and trustful relationships among siblings could be an important resource to tackle the harmful effects of stressful life-events on mental health.

## Declarations

### Author contribution statement

F. Nyarko: Conceived and designed the experiments; Performed the experiments; Contributed reagents materials, analysis tools or data; Wrote the paper.

R. L.Punamäki-Gitai: Conceived and designed the experiments; Wrote the paper.

S. Kangaslampi: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

K. Peltonen: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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### Competing interest statement

The authors declare no conflict of interest.

### Additional information

No additional information is available for this paper.

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