

Violence and Depression among Urban Youth in Baltimore and Johannesburg

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Background: Poor urban neighborhoods are violent places. Teens growing up in such neighborhoods witness violence, experience it themselves, and often live in fear of violence.

Objectives: To analyze the psychological effects of different types of violent experiences on teenagers in two poor, urban neighborhoods.

Study: 15-19 year olds in low-income neighborhoods of Baltimore and Johannesburg were recruited to participate in a study on adolescent health. Adolescents were recruited through respondent-driven sampling (RDS) and completed ACASI interviews. Logistic regressions were conducted to assess the association between three perceptions of neighborhood violence measures and depression. All analyses are stratified by site and gender.

Results: Approximately a quarter of adolescents in Baltimore and 20% in Johannesburg reported experiencing fear. Observing violence was reported by just under a quarter in Baltimore and 10% in Johannesburg while 41.2% and 67.1% in Baltimore and Johannesburg respectively reported victimization. At least one of these types of violent experiences was associated with increased depression.

Conclusions: Violence is prevalent among adolescents in Johannesburg and Baltimore. Fear, observation and victimization differ in their relationship with depression for boys and girls in each site. Better screening for experiences of different types of violence in order to provide mental health care for adolescents in these neighborhoods is important and enhancing social support mechanisms for young people may also lower levels of depression.

Introduction

Adolescence is a period of hormonal change and physical and social development (Sawyer et al., 2012). These changes have increasingly been found to be associated with an increase in a number of mental health problems with depression being the most common (Lewinsohn, Rohde, & Seeley, 1998; Patton & Viner, 2007). The World Health Organization (WHO) estimates that 20% of adolescents experience depression, anxiety or another mental health issue between the ages of 10 and 19 (WHO, 2011). Depression specifically is associated with higher morbidity and mortality (including suicide) and lower educational outcomes for adolescents (Fletcher, 2008; Lewinsohn et al., 1998; Thapar, Collishaw, Pine, & Thapar, 2012).

Adolescents and young adults are also at higher risk for experiencing violence than other age groups (Goldstein, 2011; Macmillan, 2001). The WHO estimates that 430 young people (aged 10-24) die each day from interpersonal violence and, 20 to 40 times more are treated for violence-related injuries (WHO, 2011). These numbers do not, however, include any measure of the mental health effects of violence which have been associated with lower school performance (Busby, Lambert, & Jalongo, 2013), emotional and behavioral problems (Cooley-Quille et al., 2001), cognitive effects (Margolin & Gordis, 2000), and depression, PTSD and aggressive behavior (Scarpa, 2003; Scarpa et al., 2006). Unlike depression, which may be part of the neurodevelopmental changes associated with puberty for some adolescents, experiences of violence – though common in some places – are not a biologically normal part of adolescent development. Thus, the depression associated with violence may be a normal response to a very negative situation but should potentially be responded to differently than the general mental health challenges that adolescents face. By understanding the effect of the social contexts of these adolescents' lives we may be able to better serve them.

Most analyses of the effect of violence on mental health, however, focus specifically on an individual's personal experiences of being victimized which has been found empirically to be associated with a number of mental health sequelae – depression, anxiety and aggressive behavior (Cooley-Strickland et al., 2009; Johnson et al., 2009); this paper, however, aims to expand our understanding of how violence potentially affects adolescents by testing whether fear surrounding personal safety in one's neighborhood is also associated with poorer mental health.

This analysis has two goals: 1) quantify the prevalence of three different types of experiences of violence as well as depression and 2) evaluate the associations of these violence measures with depression. We do this in a sample of adolescents from low-income urban neighborhoods in Baltimore, USA and Johannesburg, South Africa who participated in the WAVE study.

Methods

The WAVE Study

The data for this research come from the Well-being of Adolescents in Vulnerable Environments (WAVE) study in Baltimore, USA and Johannesburg, South Africa. The overall goals of the WAVE project were to understand the health of adolescents and the determinants of health and well being in vulnerable environments. The study included vulnerable adolescent boys and girls aged 15 to 19 years. Adolescents were considered vulnerable if they lived in low-income, urban environments. In this analysis, this was defined as living in the more marginalized neighborhoods of East Baltimore in Baltimore and Hillbrow in Johannesburg. These two sites were chosen because the exposure to violence was higher in both of these cities than the other cities in the WAVE study.

In both sites, there was an initial formative phase of qualitative research (Phase I) conducted in 2011 that was used to inform the quantitative survey (Phase II). The adolescents in both sites regularly commented in the interviews and focus groups about the violence they saw or personally experienced and how this made them fearful. To examine these factors more extensively, a quantitative survey was conducted in April 2013 in Baltimore and in September 2013 in Johannesburg. Data from the second phase is used in this analysis as the survey included numerous questions about violence. All research activities in phase I and II used the same survey instruments in both sites.

Both the John Hopkins Bloomberg School of Public Health IRB as well as the Human Research

Ethics Committee at the University of Witwatersrand in Johannesburg approved the survey instruments and research protocols.

Sample and Recruitment

Participants were recruited via Respondent-Driven Sampling (RDS) (Heckathorn, 2002), a chain-based recruitment method. Adolescent “seeds” were chosen to serve as the initial contact for recruiting from the target population, based on qualitative phase and recommendations from local youth serving organizations. Eligible seeds, and participants, were between the ages of 15-19 and resided in the target neighborhoods. Following informed consent, participants completed a 20-30 minute Audio Computer-Assisted Self-Interview (ACASI) survey on a laptop. The surveys were conducted in English in Baltimore and in English, isiZulu, and seSotho in Johannesburg. Participants were provided with up to three “coupons” with which to recruit eligible friends or acquaintances (Magnani, Sabin, Saidel, & Heckathorn, 2005). Adolescents received a primary cash incentive for participation and secondary incentives for up to three recruits. RDS-II estimators were calculated based on network size of the individual reported and all analyses are weighted accordingly. Post-estimation age weights were also constructed and adjusted for in the descriptive statistics so that differences in age distributions do not bias the comparisons. Further details of the methods used in this study are available elsewhere (Decker et al., 2014).

The Baltimore sample included 456 respondents, of which 57.7% were male and 42.3% were female. The mean age was 16.1 years for males and 16.5 years for females. The Johannesburg sample included 496 respondents, of which 54.5% were male and 45.2% were female. The mean age was 17.1 years for males and 17.3 years for females. Table 1 summarizes other important demographic characteristics by sex.

Survey Measures

Four key measures were used in this analysis: depression, fear of violence, observation of violence, and personal victimization. *Depression* was the key outcome of interest and was measured using the 10-item Center for Epidemiologic Studies Short Depression Scale (CESD-10). The variable was operationalized as a binary variable with a cut-off point at 10 (Radloff, 1977; Zhang et al., 2012). The scale ranges from 0 to 30 with higher scores indicating more symptoms present “most or all of the time.” The internal consistency of the scale measured by Cronbach’s alpha was 0.84 in Baltimore and 0.77 in Johannesburg – both satisfactory levels.

Three different variables were constructed based on scales of fear, observation, and personal victimization in the adolescent’s neighborhood to measure violence exposure and perceived safety. All three scales were adapted from existing scales in the CDC’s Youth Violence Compendium (Dahlberg, Toal, Swahn, & Behrens, 2005).

Fear was assessed using a scale constructed from 6 questions about how fearful the adolescent felt in their neighborhood. This scale ranged from 0 to 18, the higher scores indicating more fear in all situations in one’s neighborhood in the last year. Cronbach’s alphas were 0.87 in Baltimore and 0.77 in Johannesburg.

Observation of violence was a scale constructed from 9 questions about observing violence in the community. This scale included questions about how often in the previous 12 months the youth had experiences such as hearing gun shots, had their house broken into, seen arrests or drug deals or seen someone hurt with or without a weapon. This scale ranged from 0 to 18 with higher scores indicating more instances in which the adolescent observed violence in their neighborhood. Cronbach’s alphas were 0.87 in Baltimore and 0.84 in Johannesburg.

Victimization was assessed based on 5 questions about being threatened or hurt with or without a weapon in one’s neighborhood in the last 12 months. The scale ranged from 0 to 10 with higher scores indicating more instances of victimization. Cronbach’s alphas were 0.85 in Baltimore and 0.81 in Johannesburg.

While all three of these measures asked about the youth's experiences *in their neighborhood*, where that neighborhood was or its boundaries, was not defined for them. Thus, respondents were able to define neighborhood for themselves and we do not control for any objective neighborhood factors in this analysis.

In order to include as many people as possible, missing items in each scale – which resulted in missing total scale values – were imputed in a two-step process: first, a count of the number of missing items per scale was conducted. Second, if fewer than 33% of the items on a scale were missing then the mean of that particular item replaced the missing item. If more than 33% of the items were missing, that person was given a “missing” total on that scale.

Covariates included in the models were age (as a continuous measure), current school enrolment, perceived relative economic status, a question on who raised the adolescent, and a measure of unstable housing. These variables were chosen because of a priori theory about their importance. *Perceived economic status* was measured relative to others by asking about perception of one's economic status as the same, better off, or worse off than others. *Family structure* was constructed from self-reports about the male and female who raised the participant and categorized as two biologic parents, two parents where at least one is a step-parent or adopted, one parent, and other relatives or non-relatives. *Social Support* was developed from a scale of male and female adult social support. Finally, the *unstably housed* variable was constructed using three measures: lacking a regular place to stay OR staying in more than three places in the previous week OR spending an average of 3-4 nights a week (or less) in one's regular place over the last 30 days.

Analysis

Prevalence of depression was calculated and stratified by site and gender. We then assessed the associations between the violence perceptions variables and depression. We report the mean score of each of the violence variables as well as the means stratified by depression status. Differences of levels of exposure to the three different types of violence by depression status were tested with Student's t-tests. Post-age stratification and site-specific weights were used in comparisons across the two sites in the binary analyses.

Logistic regression models were then fitted to evaluate the odds ratios (ORs) and 95% confidence intervals (CIs) of depression in the previous 12 months by violence exposures or fear of violence. We also tested for potential different effects of victimization in the presence of fear or observation of violence (a test of interactions). An interaction of fear and victimization was not included because of multicollinearity of this measure with the others.

All regression analyses are stratified by gender because mental health is gendered (Essau, Lewinsohn, Seeley, & Sasagawa, 2010). We also adjusted for age, housing stability, school enrollment, perceived relative SES, family structure, and adult social support as these were believed to be important predictors a priori and are stratified by site because the social and cultural context around mental health may differ. Complex survey design procedures were used to adjust for clustered survey data at the seed level and to weight results by the respondent's network size and tables show both the weighted and unweighted percentages while regressions are all weighted.

Results

Girls had higher fear scores but fewer experiences of violence than boys – a pattern that was particularly evident in Johannesburg. In both sites, boys had significantly lower fear scores than girls. Conversely, boys in both sites had higher scores than girls for observed violence. Boys in Johannesburg were more likely to be victimized than girls, while in Baltimore boys had a lower mean on the victimization scale (though there was no significant difference detected). All of the violence scores were higher in Johannesburg as compared to Baltimore.

In Baltimore, 40.3% and 36.6% of males and females respectively were categorized as having depressive symptoms while in Johannesburg the proportions were higher, at 48.1% for males and 51.3%

for females (Table 2). Experiences of violence were also consistently more common among depressed adolescents in Baltimore and Johannesburg.

There were differences in experiences by depression status as well. Fear scores were higher amongst depressed adolescents in all sites, with the exception of males in Johannesburg (shown in Table 2). Conversely, there were no differences in the mean score of observed violence by depressive symptoms with the exception of females in Johannesburg. Victimization scores were higher among depressed adolescent males and females in both sites. Figure 3 shows how common it was for adolescents to report different kinds of violent experiences and how common overlap amongst the categories was – binary measures were created here with never/ever categorizations.

Results from the regression analyses explore the association between experiences of violence and depression. The first three models (table 4a) show the independent associations of each of the violence measures on depression among girls. Each measure of violence is significantly associated with an elevated risk of depression in Johannesburg in the independent models, while only fear and observation are significantly associated with depression in Baltimore. The final, full model includes each of the violence measures as well as interactions between fear-victimization and observation-victimization and is shown in table 4b. There are slight differences with the full model and the interactions are interesting. Among those that experience both fear and victimization there is no increased risk of depression while for those that observe violence and experience victimization the odds of depression are lower than in someone who experiences either alone.

Results differ slightly for males. All three experiences of violence are associated with depression for males in Baltimore, while none of the associations are significant in Johannesburg (Table 5a) in the independent models. In the adjusted analysis, when controlling for each violence measure and the interactions (Table 5b), all associations remained significant in Baltimore, while fear of violence became significantly related to a lower risk of depression in Johannesburg. As was the case for females, there was a significant interaction between observation and victimization for males in Baltimore that was, again, protective.

Discussion

In both sites, depression is very common – though slightly higher in Johannesburg. A majority in both sites report feelings of fear in their neighborhood and significant percentages report observing violence and being victimized themselves (again, all experiences are higher in Johannesburg). Observation and victimization could both be associated with loss of agency and lead to depression and no hope for future;. The results are inconsistent for observation but clearer for victimization (strongly associated with depression for everyone except boys in Johannesburg).

Beyond this, we were particularly interested in whether experiences of fear were strongly related to poor mental health even after experiences of violence were controlled for. For adolescents who experience scary or dangerous situations either directly (safe vs. unsafe areas) or indirectly (social/community knowledge about safe vs. unsafe areas), we proposed that fear was really a normal human response. Our results are therefore interesting as they help us to think about what may be different about fear. Fear is a different type of experience than observation and victimization. Ostensibly, observation and victimization could be counted. Though this is self-reported, with more detailed surveillance we could get close to measuring what a youth saw or experienced based on police or other reports and a triangulation of space and time. Fear, however, is more of a latent construct and, as Elchardus explains, it can be based on reality – actual experiences that cause someone to be fearful that those things will happen again – or community and personal narratives about what one *should* fear – driving through a “bad” neighborhood for example even if nothing bad has ever happened to *you* there (Elchardus et al., 2008). Fear is a created narrative outside of victimization or observation but fear is also based on experiences. The fact that victimization becomes more significant after fear is controlled for suggests that maybe some of the effects of fear outside of the victimization are being captured in those final models. Fear as a broader feeling outside of the fear that is caused by personal victimization is also important and needs to be better understood where it comes from, why, and what might lessen it. In our

results, when looking at the subgroup that experience victimization and fear, there is no association with depression, suggesting that fear is not a response to direct experience but more likely an indirect or social knowledge.

There are a number of possible explanations for the associations that we observed. First, maybe fear and victimization are simply more harmful than observation. Our data don't answer why this might be the case but maybe fear and victimization affect the respondent themselves in a way that observation is more distant. Second, the data suggest that victimization is more harmful for girls than boys and we do not know anything about the *type* of victimization here but maybe the types of victimization experienced matter. Third, it is possible that the measures used to assess violence observation are imprecise, although scales used had strongest Cronbach's alpha. Victimization may be easier to recall while fear may be a more constant feeling that is not affected by recall in the same way. Fourth, it is possible that in places where some of the events included in our observation scale – arrests, drug deals etc. – are quite common, that these incidences are so normalized that they are no longer associated with depression. Also, fear may be protective for boys in Johannesburg – that it is a normal response in an environment where violence is common. Maybe fear responses suggest agency and so may be associated with more positive mental health. Finally, there are data limitations, which are discussed more below. These results suggest the need to better understand the mechanisms of *how* violence affects kids. Does fear cause some kids to pull back and disengage while for others it causes an adrenaline rush that allows them to find safety or ignore the danger? Why – and how – is victimization outside of fear associated with depression? Is observing certain incidents more important than others?

Differences across the sites are also interesting. Boys in Baltimore were more likely to be depressed if they had been personally victimized (in the full model) while there seems to be no or weak relationships between any kind of violence and depression for boys in Johannesburg. This is true even though more boys in Johannesburg report more depressive symptoms and more violence. There are several reasons why boys in Johannesburg may report a less strong relationship. For example, there may be other factors for boys in Johannesburg that are more strongly related to depression or victimization may be more normalized for boys in Johannesburg and a right of passage or a sign of successful growth into adult masculinity. For girls across the two sites, the patterns are more similar. In the final model, fear and victimization are both associated with increased depressive symptoms in both sites while observation is also associated for girls in Johannesburg. This begs the question of differences between the sites that are cultural, social, or economic. Do teens in Baltimore find different things fearful than teens in Johannesburg? Is the type of violence they see regularly different? Or are the causes of that violence and how intertwined the youth are with it themselves different? What is going on in Johannesburg for boys that is so different than our other three groups? Our data do not answer these questions but these questions do suggest avenues for future research in order to better understand the difference in the mechanisms across site and gender.

Though this study helps us understand the ways in which experiences of violence may lead to depression, there are several limitations. First, the cross-sectional nature of the data limits our ability to understand the direction of these relationships. This is particularly challenging in understanding the relationship between fear and depression as fear has been explored as a symptom of depression in the literature. Future research should focus on teasing apart the timing of the relationships and whether there is causality going both ways. Cross-sectional data is unable to establish temporality so the question remains of whether the violence events precede depression or is depression associated with antisocial nihilistic behaviour, including hanging out in places where violence is frequent and observation might be common. Second, we do not know which youth perpetrate violence and future research should explore whether there are differences by who the perpetrator is or whether the youth themselves is ever a perpetrator. Third, all of our measures are perception measures – how much violence the youth *perceives* there to be. Even the victimization questions are based on perceptions of victimization and are not hard measures of experiences. It is possible that more depressed youth *perceive* more violence and less support even if those perceptions do not match reality. Fourth, we are not measuring PTSD here which might be a better measure to explore in response to violent experiences. Finally, respondent driven

sampling strives to reach hard to reach populations that might be missed in other places but its representativeness of the underlying population is hard to test.

It is also important in interpreting these results to remember that much of the neighborhood literature explores how we define neighborhood extensively. Census tracts, neighborhood statistical areas, and other measures of neighborhood have all been shown to be different than how residents themselves define the boundaries of their neighborhoods themselves (Clapp & Wang, 2006; Nau, 2013). Thus, in this study we did not attempt to control for governmentally defined boundaries to neighborhoods but rather let the youth define their own perception of what their “neighborhood” was. Some people may find fault with this, although we believe that it may more accurately account for the contexts the youths themselves spend time in and feel affect or shape their mental health.

Conclusion

Teens who live in poor urban neighborhoods are often victims of violence, witnesses to violence, and live in fear of violence. These events in their lives are associated with depression. These findings support the hypothesis that different types of violent experiences are differently associated with poor mental health outcomes and that fear and depression specifically are very related which is similar to the findings in previous research (Johnson et al., 2009). They also suggest that there are complex interactions between these three measures and depression. Ideally, we will find ways to make cities less violent; however, if that is impossible, then we must aim to develop programs that mitigate the mental health effects of violence on the teenagers who experience this violence. Our results suggest that across cultures and genders youth who experience fear based on their perception of the violence in their communities may be more likely to be depressed and that structural intervention in poor neighborhoods are important for improving the health of adolescents. Doctors and advocates working with young people should be attuned to these experiences and the gender differences (which may be affected by the type of victimization) and help youth who may be more likely to experience depressive symptoms access resources that might help them respond to these violence experiences in their lives.

Table 1. Prevalence of demographic, family and household level characteristics by gender and site

Shown as (RDS adjusted % (UW%, n/N) or (RDS adjusted mean (UW mean, RDS adjusted SE)) for means				
	Baltimore		Johannesburg	
<u>Sex</u>				
Male	46.4 (57.7, 263)		56.7 (54.8, 272)	
Female	53.6 (42.3, 193)		43.3 (45.2, 224)	
	Male (N=263)	Female (N=193)	Male (N=272)	Female (N=224)
<u>Age Group</u>				
15-16	60.6 (61.2, 161)	50.2 (47.2, 91)	31.1 (25.7, 70)	26.1 (23.7, 53)
17-19	39.4 (38.8, 102)	49.8 (52.8, 102)	68.9 (74.3, 202)	73.9 (76.3, 171)
Mean Age (SE)	16.1 (16.1, 0.34)	16.4 (16.5, 0.07)	17.1 (17.2, 0.24)	17.3 (17.3, 0.18)
<u>Perceived Economic Status</u>				
Better Off Than Most	37.4 (39.4, 100/254)	34.7 (28.3, 54/191)	25.7 (22.1, 60)	16.7 (22.3, 50)
About the Same as Most	55.1 (54.3, 138/254)	58.4 (64.9, 124/191)	64.0 (69.1, 188)	74.4 (68.8, 154)
Worse than Most	7.5 (6.3, 16/254)	7.0 (6.8, 13/191)	10.3 (8.8, 24)	8.9 (8.9, 20)
<u>Unstably Housed</u>				
No	76.6 (80.2, 211)	83.7 (87.6, 169)	50.9 (60.7, 165)	64.2 (68.3, 153)
Yes	23.4 (19.8, 52)	16.3 (12.4, 24)	49.1 (39.3, 107)	35.8 (31.7, 71)
<u>In School</u>				
Yes	81.2 (86.7, 228)	82.6 (83.3, 160/192)	77.1 (72.0, 195)	94.3 (94.6, 211/223)
No	18.8 (13.3, 35)	17.5 (16.7, 32/192)	22.9 (28.0, 76)	5.7 (5.4, 12/223)
<u>Raised By:</u>				
Two Parents (biological)	33.1 (32.8, 86/262)	40.7 (34.2, 66)	28.4 (31.4, 85/271)	38.2 (36.2, 81)
Two parents (one not biological)	9.2 (10.3, 27/262)	13.4 (14.0, 27)	17.6 (19.9, 54/271)	18.6 (22.3, 50)
One Parent	34.3 (22.9, 60/262)	21.3 (23.3, 45)	12.1 (9.6, 26/271)	8.4 (9.8, 22)
Other (incl. relatives as well as others)	23.4 (34.0, 89)	24.9 (28.5, 55)	41.9 (39.1, 106/271)	34.8 (31.7, 71)

Table 2. Prevalence of Depression in Baltimore and Johannesburg and Summary of Scores on Scales Stratified by Site, Gender, and Depression Status

Shown as: weighted %, (n) for %s and (weighted mean (wSE)) for means

	Females			Males		
	Total	Depressed	Not Depressed	Total	Depressed	Not Depressed
Baltimore	N=193	36.6 (82)	63.4 (111)	N=263	40.3 (110)	59.7 (153)
Johannesburg	N=224	51.3 (99)	48.7 (125)	N=272	48.1 (133)	51.9 (139)
Baltimore						
Fear	5.5 (0.4)	7.6 (1.2)**	4.3 (0.19)	3.2 (0.18)***	4.3 (0.17)**	2.5 (0.24)
Observation	6.3 (0.37)	6.4 (0.65)	6.2 (0.52)	7.0 (0.32)	8.1 (0.50)	6.2 (0.27)
Victimization	1.0 (0.12)	1.3 (0.3)**	0.92 (0.08)	0.78 (0.07)	1.4 (0.23)**	0.36 (0.05)
Johannesburg						
Fear	6.5 (0.09)	7.5 (0.32)**	5.4 (0.26)	5.3 (0.33)***	5.4 (0.71)	5.3 (0.28)
Observation	7.0 (0.23)	7.9 (0.15)**	6.1 (0.38)	8.9 (0.38)***	9.8 (0.49)	8.0 (0.68)
Victimization	1.1 (0.08)	1.4 (0.20)***	0.81 (0.07)	2.3 (0.16)***	2.8 (0.22)***	1.9 (0.22)

*** p<0.001, ** p<0.01, * p<0.05

Bold numbers show statistically significant differences between those categorized as depressed and those categorized as not depressed

Italicized numbers show statistically significant differences in overall means across gender

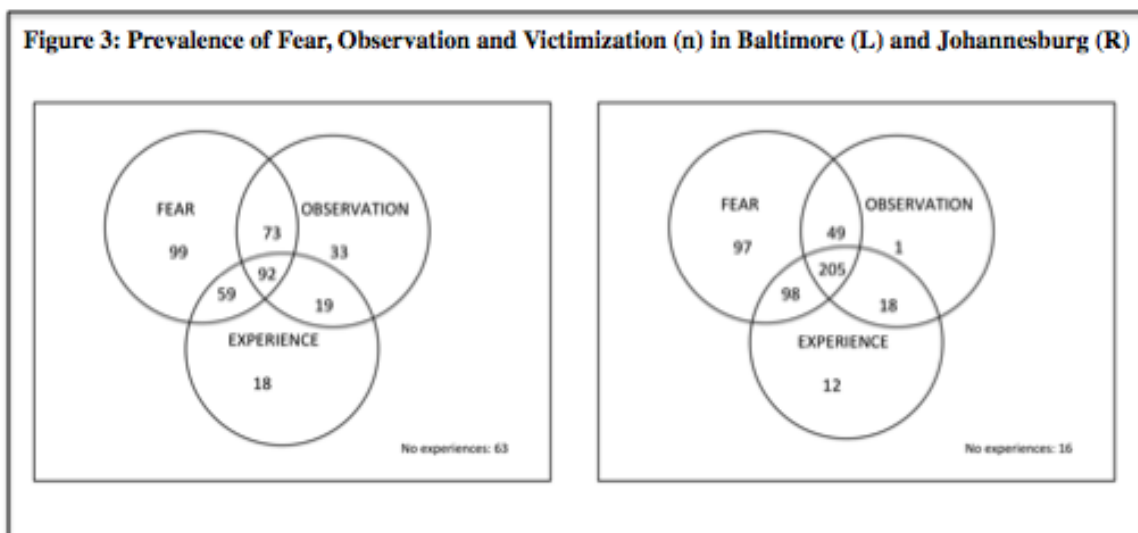


Table 4a: Violence Determinants of Depression Among Female Adolescents in Baltimore and Johannesburg

	Model 1 Baltimore	Model 2 Johannesburg	Model 3 Baltimore	Model 4 Johannesburg	Model 5 Baltimore	Model 6 Johannesburg
VARIABLES	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Fear	1.05*** (1.03 - 1.08)	1.06** (1.03 - 1.1)				
Observation			0.99 (0.96 - 1.04)	1.05** (1.02 - 1.08)		
Victimization					1.00 (0.97 - 1.05)	1.06** (1.02 - 1.11)
Age	0.77*** (0.71 - 0.85)	0.91** (0.85 - 0.96)	0.76*** (0.69 - 0.826)	0.93* (0.88 - 0.99)	0.76*** (0.69 - 0.83)	0.92* (0.86 - 0.98)
In-school	1.76 (0.66 - 4.7)	1.07 (0.56 - 2.07)	1.41 (0.41 - 4.879)	0.96 (0.57 - 1.63)	1.44 (0.44 - 4.65)	1.00 (0.61 - 1.64)
Perceived Economic Status – better than (ref: same as)	0.80 (0.49 - 1.32)	1.04 (0.81 - 1.35)	0.94 (0.5 - 1.741)	0.98 (0.75 - 1.27)	0.96 (0.48 - 1.89)	1.02 (0.81 - 1.282)
Perceived Economic Status – worse than (ref: same as)	1.82* (1.06 - 3.1)	1.31** (1.12 - 1.54)	1.86 (0.82 - 4.199)	1.23** (1.07 - 1.43)	1.84 (0.72 - 4.72)	1.27* (1.06 - 1.52)
Raised by: at least one non-biologic parents (ref: two biologic parents)	0.97 (0.49 - 1.93)	0.93 (0.59 - 1.45)	1.10 (0.53 - 2.278)	0.94 (0.54 - 1.62)	1.08 (0.47 - 2.49)	0.91 (0.6 - 1.38)
Raised by: One parent (ref: two biologic parents)	0.66 (0.34 - 1.28)	1.11 (0.79 - 1.57)	0.58 (0.33 - 1.029)	1.11 (0.84 - 1.45)	0.58 (0.33 - 1.03)	1.09 (0.87 - 1.36)
Raised by: Other (ref: two biologic parents)	0.92 (0.62 - 1.37)	1.05 (0.7 - 1.42)	0.98 (0.64 - 1.507)	1.14 (0.87 - 1.48)	0.98 (0.66 - 1.46)	1.02 (0.77 - 1.36)
Adult Social Support	0.96*** (0.96 - 0.97)	0.99 (0.97 - 1.02)	0.95** (0.92 - 0.979)	0.99 (0.96 - 1.02)	0.95** (0.92 - 0.98)	0.98 (0.95 - 1.02)
Unstably Housed	1.59*** (1.4 - 1.8)	1.38* (1.08 - 1.77)	1.29 (0.87 - 1.910)	1.33* (1.07 - 1.64)	1.27* (1.02 - 1.60)	1.36* (1.06 - 1.73)
Constant	19.24** (3.55 - 104.32)	1.63 (0.53 - 5.08)	61.12** (8.945 - 417.710)	1.24 (0.27 - 5.75)	57.92** (10.64 - 315.31)	2.29 (0.55 - 9.64)
Observations	188	217	185	217	187	217

95% CI in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 4b: Determinants of Depression Among Female Adolescents in Baltimore and Johannesburg – Full Model

	(1) Baltimore	(2) Johannesburg
VARIABLES	odds ratio	odds ratio
Fear	1.07** (1.04 - 1.1)	1.07*** (1.05 - 1.09)
Observation	1.02 (0.99 - 1.04)	1.06*** (1.03 - 1.09)
Victimization	1.21** (1.12 - 1.32)	1.42*** (1.25 - 1.63)
Fear X Victimization	1.01 (1.0 - 1.01)	0.99 (0.98 - 1.00)
Observation X Victimization	0.97*** (0.96 - 0.98)	0.98*** (0.97 - 0.99)
Age	0.80** (0.72 - 0.88)	0.92* (0.87 - 0.98)
In-school	1.25 (0.4 - 3.89)	0.90 (0.48 - 1.68)
Perceived Economic Status – better than (ref: same as)	0.72 (0.52 - 1.01)	0.91 (0.66 - 1.28)
Perceived Economic Status – worse than (ref: same as)	1.63 (0.76 - 3.51)	1.38** (1.14 - 1.66)
Raised by: at least one non-biologic parents (ref: two biologic parents)	1.04 (0.73 - 1.48)	0.90 (0.53 - 1.52)
Raised by: One parent (ref: two biologic parents)	0.69 (0.41 - 1.15)	1.09 (0.83 - 1.43)
Raised by: Other (ref: two biologic parents)	1.03 (0.71 - 1.48)	1.05 (0.82 - 1.35)
Adult Social Support	0.96*** (0.95 - 0.97)	1.00 (0.97 - 1.02)
Unstably Housed	1.40* (1.12 - 1.75)	1.32* (1.07 - 1.62)
Constant	14.97* (2.29 - 97.72)	0.82 (0.21 - 3.25)
Observations	185	217

95% CI in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 5a: Violence Determinants of Depression Among Male Adolescents in Baltimore and Johannesburg

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Baltimore	Johannesburg	Baltimore	Johannesburg	Baltimore	Johannesburg
	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Fear	1.07*** (1.05 - 1.09)	1.02 (0.94 - 1.1)				
Observation			1.05*** (1.03 - 1.07)	1.03 (0.97 - 1.1)		
Victimization					1.14* (1.03 - 1.27)	1.05 (0.99 - 1.12)
Age	1.05 (0.94 - 1.17)	0.98 (0.79 - 1.22)	1.02 (0.92 - 1.15)	0.98 (0.82 - 1.19)	1.09 (0.97 - 1.22)	0.98 (0.79 - 1.22)
In-school	1.27 (0.71 - 2.25)	0.89 (0.74 - 1.09)	1.20 (0.662 - 2.17)	0.95 (0.80 - 1.07)	1.23 (0.75 - 2.02)	0.94 (0.84 - 1.06)
Perceived Economic Status – better than (ref: same as)	1.17 (0.81 - 1.7)	0.64 (0.29 - 1.42)	1.15 (0.79 - 1.68)	0.69 (0.4 - 1.2)	1.10 (0.71 - 1.72)	0.67 (0.35 - 1.3)
Perceived Economic Status – worse than (ref: same as)	0.47* (0.28 - 0.79)	1.08 (0.47 - 2.50)	0.64 (0.29 - 1.43)	0.97 (0.37 - 2.57)	0.56 (0.24 - 1.31)	1.01 (0.45 - 2.3)
Raised by: at least one non-biologic parents (ref: two biologic parents)	1.80 (0.6 - 5.44)	1.30 (0.59 - 2.84)	1.80 (0.54 - 6.02)	1.33 (0.63 - 2.82)	1.47 (0.35 - 6.09)	1.28 (0.59 - 2.81)
Raised by: One parent (ref: two biologic parents)	1.33 (0.86 - 2.06)	0.94 (0.47 - 1.87)	1.37 (0.72 - 2.61)	0.90 (0.37 - 2.19)	1.49 (0.79 - 2.8)	0.92 (0.37 - 2.26)
Raised by: Other (ref: two biologic parents)	0.99 (0.66 - 1.51)	0.94 (0.56 - 1.58)	1.04 (0.66 - 1.64)	0.87 (0.55 - 1.38)	0.97 (0.5 - 1.86)	0.90 (0.53 - 1.54)
Adult Social Support	0.97 (0.93 - 1.02)	0.99 (0.97 - 1.01)	0.97 (0.92 - 1.03)	0.98 (0.97 - 1.0)	0.98 (0.93 - 1.05)	0.99 (0.97 - 1.01)
Unstably Housed	0.65 (0.41 - 1.02)	1.19 (0.83 - 1.69)	0.67 (0.41 - 1.11)	1.22 (0.88 - 1.68)	0.66 (0.43 - 1.0)	1.21 (0.84 - 1.73)
Constant	0.17 (0.01 - 4.56)	0.81 (0.02 - 33.62)	0.22 (0.01 - 7.33)	0.62 (0.02 - 20.19)	0.08 (0.00 - 3.11)	0.74 (0.01 - 38.88)
Observations	253	250	254	250	251	249

95% CI in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 5b: Determinants of Depression Among Male Adolescents in Baltimore and Johannesburg – Full Model

	(1) Baltimore	(2) Johannesburg
VARIABLES	odds ratio	odds ratio
Fear	1.05* (1.02 - 1.08)	0.95* (0.91 - 0.99)
Observation	1.04* (1.01 - 1.08)	1.05 (0.95 - 1.16)
Victimization	1.27*** (1.16 - 1.4)	1.01 (0.87 - 1.16)
Fear X Victimization	1.00 (1.0 - 1.01)	1.02 (0.99 - 1.06)
Observation X Victimization	0.98** (0.97 - 0.99)	0.99 (0.95 - 1.03)
Age	1.06 (0.94 - 1.19)	0.98 (0.81 - 1.17)
In-school	1.18 (0.71 - 1.98)	0.83 (0.6 - 1.16)
Perceived Economic Status – better than (ref: same as)	1.08 (0.75 - 1.57)	0.70 (0.38 - 1.31)
Perceived Economic Status – worse than (ref: same as)	0.36** (0.2 - 0.66)	0.96 (0.41 - 2.24)
Raised by: at least one non-biologic parents (ref: two biologic parents)	1.60 (0.50 - 5.13)	1.37 (0.82 - 2.29)
Raised by: One parent (ref: two biologic parents)	1.43 (0.94 - 2.17)	0.87 (0.41 - 1.85)
Raised by: Other (ref: two biologic parents)	1.03 (0.58 - 1.82)	0.84 (0.57 - 1.24)
Adult Social Support	0.98 (0.93 - 1.04)	0.98 (0.96 - 1.0)
Unstably Housed	0.73 (0.45 - 1.18)	1.18 (0.89 - 1.57)
Constant	0.09 (0.0 - 2.66)	0.83 (0.03 - 25.44)
Observations	250	249

References

- Busby, D. R., Lambert, S. F., & Jalongo, N. S. (2013). Psychological Symptoms Linking Exposure to Community Violence and Academic Functioning in African American Adolescents. *Journal of Youth and Adolescence, 42*(2), 250–262. doi:10.1007/s10964-012-9895-z
- Clapp, J. M., & Wang, Y. (2006). Defining neighborhood boundaries: Are census tracts obsolete? *Journal of Urban Economics, 59*(2), 259–284. doi:10.1016/j.jue.2005.10.003
- Cooley-Quille, M., Boyd, R. C., Frantz, E., & Walsh, J. (2001). Emotional and Behavioral Impact of Exposure to Community Violence in Inner-City Adolescents. *Journal of Clinical Child Psychology, 30*(2), 199–206.
- Cooley-Strickland, M., Quille, T. J., Griffin, R. S., Stuart, E. A., Bradshaw, C. P., & Furr-Holden, D. (2009). Community Violence and Youth: Affect, Behavior, Substance Use, and Academics. *Clinical Child and Family Psychology Review, 12*(2), 127–156. doi:10.1007/s10567-009-0051-6
- Dahlberg, L., Toal, S., Swahn, M., & Behrens, C. (2005). *Measuring Violence-Related Attitudes, Behaviors, and Influences Among Youths: A Compendium of Assessment Tools Second Edition*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Retrieved from http://www.cdc.gov/violenceprevention/pdf/yv_compendium.pdf
- Decker, M., Kalamar, A., Covarubias, L., Sonenstein, F., Blum, R., & Marshal, B. (2014). (To be published) Respondent-driven sampling to reach adolescents in vulnerable environments in five urban cities globally. *Journal of Adolescent Health, Unpublished*(Special Issue).
- Elchardus, M., Groof, S. D., & Smits, W. (2008). Rational Fear or Represented Malaise: A Crucial Test of Two Paradigms Explaining Fear of Crime. *Sociological Perspectives, 51*(3), 453–471. doi:10.1525/sop.2008.51.issue-3
- Essau, C. A., Lewinsohn, P. M., Seeley, J. R., & Sasagawa, S. (2010). Gender differences in the developmental course of depression. *Journal of Affective Disorders, 127*(1-3), 185–190. doi:10.1016/j.jad.2010.05.016

- Fletcher, J. M. (2008). Adolescent depression: diagnosis, treatment, and educational attainment. *Health Economics*, 17(11), 1215–1235. doi:10.1002/hec.1319
- Goldstein, J. R. (2011). A Secular Trend toward Earlier Male Sexual Maturity: Evidence from Shifting Ages of Male Young Adult Mortality. *PLoS ONE*, 6(8), e14826.
doi:10.1371/journal.pone.0014826
- Heckathorn, D. D. (2002). Respondent-Driven Sampling II: Deriving Valid Population Estimate from Chain-Referral. *Social Forces*, 49(1), 11–34.
- Johnson, S. L., Solomon, B. S., Shields, W. C., McDonald, E. M., McKenzie, L. B., & Gielen, A. C. (2009). Neighborhood Violence and its Association with Mothers' Health: Assessing the Relative Importance of Perceived Safety and Exposure to Violence. *Journal of Urban Health*, 86(4), 538–550. doi:10.1007/s11524-009-9345-8
- Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1998). Major depressive disorder in older adolescents: Prevalence, risk factors, and clinical implications. *Clinical Psychology Review*, 18(7), 765–794.
doi:10.1016/S0272-7358(98)00010-5
- Macmillan, R. (2001). Violence and the Life Course: The Consequences of Victimization for Personal and Social Development. *Annual Review of Sociology*, 27(1), 1–22.
doi:10.1146/annurev.soc.27.1.1
- Magnani, R., Sabin, K., Saidel, T., & Heckathorn, D. D. (2005). Review of sampling hard-to-reach and hidden populations for HIV surveillance. *AIDS*, 19(Supplement 2), S67–S72.
- Margolin, G., & Gordis, E. B. (2000). The Effects of Family and Community Violence on Children. *Annual Review of Psychology*, 51(1), 445–479. doi:10.1146/annurev.psych.51.1.445
- Nau, C. (2013). Monte carlo simulation-based recommendations for reducing the risk of bias in multilevel models introduced by mis-measuring the neighborhood. Presented at the conference for the Population Association of America, May 2013. Presented at the PAA, New Orleans.
- Patton, G. C., & Viner, R. (2007). Pubertal transitions in health. *The Lancet*, 369(9567), 1130–1139.
doi:10.1016/S0140-6736(07)60366-3

- Radloff, L. S. (1977). The CES-D Scale A Self-Report Depression Scale for Research in the General Population. *Applied Psychological Measurement, 1*(3), 385–401.
doi:10.1177/014662167700100306
- Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S.-J., Dick, B., Ezech, A. C., & Patton, G. C. (2012). Adolescence: a foundation for future health. *Lancet, 379*(9826), 1630–1640.
doi:10.1016/S0140-6736(12)60072-5
- Scarpa, A. (2003). Community Violence Exposure in Young Adults. *Trauma, Violence, & Abuse, 4*(3), 210–227. doi:10.1177/1524838003004003002
- Scarpa, A., Hurley, J. D., Shumate, H. W., & Haden, S. C. (2006). Lifetime Prevalence and Socioemotional Effects of Hearing About Community Violence. *Journal of Interpersonal Violence, 21*(1), 5–23. doi:10.1177/0886260505281661
- Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *Lancet, 379*(9820), 1056–1067. doi:10.1016/S0140-6736(11)60871-4
- WHO. (2011). WHO | Young people: health risks and solutions. Retrieved May 7, 2014, from <http://www.who.int/mediacentre/factsheets/fs345/en/>
- Zhang, W., O'Brien, N., Forrest, J. I., Salters, K. A., Patterson, T. L., Montaner, J. S. G., ... Lima, V. D. (2012). Validating a Shortened Depression Scale (10 Item CES-D) among HIV-Positive People in British Columbia, Canada. *PLoS ONE, 7*(7), e40793. doi:10.1371/journal.pone.0040793

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