

**Associations between Community Violence and Sexual Risk-Taking in
Baltimore and Johannesburg: An Analysis of Two Sites of the Well-Being of
Adolescents in Vulnerable Environments (WAVE) Study**

by
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A dissertation submitted to Johns Hopkins University in conformity with the
requirements for the degree of Doctor of Philosophy

Baltimore, Maryland
September 2015

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Dissertation Abstract

Background

Sexual health is one of the most important health concerns for adolescents worldwide as it has short and long term consequences for both morbidity and mortality. Early pregnancy and sexually transmitted infections contribute greatly to the burden of disease during this period of life. Poor adolescents in urban areas are more likely to experience negative sexual health than their wealthier peers. They are also more likely to be the victims of violence; yet, associations between different experiences of community violence and sexual behaviors have been rarely studied in poor, urban populations.

Methods

Using data from adolescents in the Well-Being of Adolescents in Vulnerable Environments (WAVE) Study, I explored relationships between adolescent perceptions of community violence and sexual activity. I hypothesized that experiencing violence would be associated with increased risk taking. In the first paper I used multiple logistic regression analyses to examine the association of experiences of three different types of violence in the community (fear of violence, observation of violence, and personal victimization) with two sexual behaviors (sexual intercourse in the last year and condom use at last sex) in Baltimore. Each violence variable was included separately in three different models and then in one model that included all three experiences of violence together. One outcome (sexual intercourse in the last year) was not hypothesized to be risky per se and therefore to be less associated with violence while the other (condom use) was hypothesized to more strongly correlated with negative sexual outcomes and therefore more strongly associated with violence. In the next step of the analysis, I performed multiple logistic regression modeling to examine whether depression or post-

traumatic stress disorder confounded the associations between violence and sexual behaviors. Finally, in the third paper, I conducted logistic regression analyses among respondents in Johannesburg to assess whether similar patterns were observed compared to Baltimore.

Results

In Baltimore, results showed that violence was associated with sexual activity in the last year for both boys and girls. All three experiences of violence were associated with more sexual activity for girls though associations with fear were attenuated in the model adjusting for other violence experiences. For boys, fear was associated with less sexual activity, observation with more, and victimization was not significantly associated with sexual activity. In terms of condom use, there were fewer associations across both genders. Fear was associated with lower odds of condom use for girls while observation was associated with lower odds of condom use for boys. There was no evidence that mental health confounded these relationships. In Johannesburg, there were some similarities and differences in relation to Baltimore results. For girls, observation was associated with greater odds of having had sexual intercourse in the last year while victimization was associated with lower odds. For boys, fear was also associated with lower odds of sexual intercourse and other forms of violence were not significantly related. Violence was not associated with condom use in Johannesburg.

Conclusions

Violence is not strongly associated with non-use of condoms in either Baltimore or Johannesburg and therefore reducing violence may have little effect on poor sexual health outcomes. However, the associations between violence – a negative exposure – and

sexual activity suggests that exploring with more depth the negative or positive experiences of adolescent sexual activity is essential. Types of partnerships, measures of sexual satisfaction, and measures of efficacy in decision-making may allow a better understanding of the effect of on risky types of sexual activity.

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Acknowledgements

When I talk to people who are thinking about research careers or applying to PhD programs, I usually ask them “What’s your story? Where are you coming from, where are you going, and why does this now make sense?” Writing this dissertation was a journey. In order to appropriately acknowledge the right people, I need to tell my story a little bit. From the time I spent at Seeds of Peace in high school and college, to my time spent studying and working abroad, to my masters program, and now to this doctoral degree, the underlying questions that have guided my work focused on thinking about “How can we support people to make the healthy decisions they already want to make in order to lead healthier, happier lives and provide for their families?” The content focus has changed from questions about girls’ education to women’s income and health and now to adolescents and urban violence, but the continuity is clearer than I realized until recently.

In order to understand how to answer those questions in fuller, broader ways, people at Hopkins pushed me to think not only outside of the world of international development that I came in thinking I would work in, but also outside my comfort zone of women’s and reproductive health. The questions posed in this dissertation that explore violence and adolescent health and use data from Baltimore to do so are not where I thought I would end up when I started this journey, but have been so much more fulfilling than I ever imagined. The first people I have to thank are the young people who participated in the WAVE Study all around the world. Without knowing their names or much about their identities they have provided answers for me to further my questions, begin my career as a researcher, and, hopefully, to begin to help them live happier, healthier, safer lives. It is the ultimate inequity that they continue to live in the neighborhoods I study in this dissertation and that I get to graduate with a PhD. I hope to never take that for granted.

The next set of people to thank are a series of advisors. I would like to thank Dr. Dan Levy at Harvard Kennedy School who pushed and questioned but didn’t laugh at me when I raised the idea of doctorate. Dan has continued to be a source of groundedness and wisdom throughout the last 4 years. I would like to thank Dr. Nan Astone, my first advisor at Hopkins, who asked questions that made me step outside my box and realize where I might “fit.” She also reminded me that our worlds are smaller than we think and that I follow in a line of people I love and respect when she showed me that *her* dissertation acknowledgements included one to my best friend from childhood – for whom she babysat 30 years ago. I would like to thank the rest of the WAVE Study team – particularly Beth Marshall, Kristin Mmari, and Freya Sonenstein – who helped me learn how to design a survey instrument, guided some of the initial analyses of this dataset, and were emotionally and intellectually present and available.

Next, I need to thank my two advisors in this dissertation writing phase – Dr. M.E. Hughes and Dr. Caroline Moreau. Not only did they tolerate my moments of frustration, slowness, bad writing, and ineptitude but they did so with grace and patience. And the *hours* they spent meeting with me, talking through my ideas, editing (even in a round of final edits as I write these words), and generally being supportive of my emotional well-being cannot be adequately described in words. Having two advisors can be a challenge

for some but it could not have been a more positive experience for me. I admire how well they complemented each other and how interesting it was to hear them talk to each other about my work and ideas. The way they supported me will no doubt shape the way I approach and guide students in the future. If I can emulate them, my students and mentees in the future will be lucky.

The STI T-32 Training Grant provided me not only the financial resources to engage in this research but also a supportive community at Hopkins of other mentors and students to bounce ideas off of and to keep me on track. Dr. Jacky Jennings and Dr. Susan Sherman mold that space and the other doctoral students have provided professional feedback and emotional support.

The professors I taught with over the last four years – Dr. M.E. Hughes, Dr. Bob Blum, Dr. Donna Strobino, Dr. Emily Agree, and Dr. Caroline Moreau – provided examples of how to be teachers, mentors, and scholars. Lauren Black was indispensable and helpful.

I must also explicitly thank my final defense committee – Dr. Caroline Moreau, Dr. M.E. Hughes, Dr. Larissa Jennings and Dr. Kathy Edin – for their thoughtful feedback into this work and willingness to be present to usher me into this next step of the journey. I need to also thank my alternates, Dr. Susan Sherman and Dr. Kristin Mmari, for being willing to be “on hold.” And I need to thank the other members of my preliminary oral exam committee who provided helpful feedback on this research in its formative stages: Dr. Bob Blum, Dr. Nan Astone, Dr. Jacky Jennings, Dr. Sarah Lindstrom Johnson, and Dr. Pamela Surkan.

When I started my PhD, a college friend said “Remember it’s a marathon, not a sprint.” There are so many classmates and friends who helped me get through the marathon – talking, letting me crash with them, sitting on trains, editing, feeding me, talking about methods and theses, and giving me wine. My cohortmates: Matt Goldshore, Susan Christiansen, Amanda Kalamar, Jenita Parekh, Jocelyn Kelly, and Samira Soleimanpour are some of the brightest people out there. Friends in other cohorts and departments: Lizzie Harvey, Anna Kaagesten, Eoghan Brady, Ann Herbert, Lucy Hebert, Laura Hinson, Meghan Gallagher, Megan Reilly, Evan Rusuja. Roommates in Baltimore and Washington: Emily Doerr, Amy Tannenbaum, and Lee Gilman. And other life long friends: Fatima Quraishi, Erica Rotstein, Beth Adler, Leia Reisner, Jalle Gebisa, Lyndsey McMahan, Kelsey Harden Pierce, Keli Campbell, Chelsey Berlin, Aaron Rosenberg, Jim Gagne, Barrie Jacob, Maire Casey. I actually could not have done it without you. Your support and emotional capacity to engage and love me are unreal.

Finally, my family. They have watched as I have moved to war zones, to African villages, through three cities in this graduate school process, and through so many ups and downs. One of the reasons I came to Hopkins was in order to be closer to my grandmother who lived in Washington, D.C. She passed away exactly one year ago and I can’t imagine a better way to honor her than to defend this dissertation. The common refrain to “write a methods section so that your grandmother can understand it” was not a hypothetical for me. Every single time I saw her she said “Hannah, you have to tell me more about what

you're writing about! I want to read it. You have to explain it to me!" She would have been sitting in the defense room an hour before it started if she were still here today.

The apple doesn't fall far from the tree in my family. I find myself following in both of my parents footsteps – as an intellectual, as an academic, as a researcher, and as someone who cares for adolescents and the health and well-being of people. I can not imagine better role models for integrity, love, humility, pride in their work, and a commitment to social justice and am so unbelievably lucky that they continue to support me, love me, and push me. In tearful conversations with both of my sisters – Tess and Emma – in the last few weeks about stress and life and goals, one of them told me I could move in with her and raise my (still non-existent) kids with her (still non-existent) kids if I needed to, while the other unexpectedly paypal'd me \$15 to take myself out for breakfast the next day just because "sometimes it's nice to have someone else take care of that for you." I cannot imagine life without them and can't believe how lucky I am that they are in my life.

I am so fortunate.

Thank you.

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Chapter 1: Introduction

... My little sister, one day I took her to the park. She picked up a plastic bag in the park, and I'm trying to figure out why she was dragging the bag. The man was like, "Yo, yo, yo, don't let her touch that!" So I picked up the bag and looked inside the bag. There was a gun in the bag. If that thing would have been unlocked or something, she could have shot herself. That's dangerous. (Female between 15 and 19 years old, Baltimore)

It's not safe because, for an example now talking from experience, on Monday I was mugged and they took my cell phone from me and they had a knife and that happened when I was coming back from rugby practice. I was coming there by Shoprite and it was dark and I think it was probably around [8:30 pm] in the evening. So there is crime... (15-year-old male, Johannesburg)

Violence is a key component of life for many urban adolescents.^{1,2} The quotes above, from the qualitative phase of the Well-Being of Vulnerable Environments (WAVE) Study, reflect this aspect of young people's lives in urban environments.³ The WAVE Study explored the predictors of ill-health for adolescents in five low-income, urban settings around the world. In two sites in particular, Baltimore and Johannesburg, violence permeated the most mundane parts of these disadvantaged young peoples' lives from how safe they felt at home, school, or in their neighborhoods to when they walked around to who they spent time with and how they interacted with their families, neighbors, peers, or the police.⁴

A number of studies have shown a connection between violence and sexual behaviors, including intimate partner violence (IPV), gender based violence (GBV), and teen dating violence (TDV).^{5,6} Other forms of community violence that are not explicitly sexual or intimate in nature may also affect sexual health; but these associations are less well understood. One study showed that observing or being a victim of a stabbing or a shooting was associated with an increased risk of sexually transmitted infections.⁷ Other experiences of violence – such as observing or fearing violence – have been examined

less in the context of sexual health.

Violence may not directly affect adolescent sexual behaviors, but may have indirect effects on sexual behaviors through other cognitive processes such as poor mental health. In other words, I hypothesize that because community violence is associated with poorer mental health, which is, in turn, associated with poor sexual health outcomes, violence is likely associated with poor sexual health. Violence is associated with a number of mental health outcomes – including but not limited to, post traumatic stress,⁸⁻¹⁰ depression,¹¹⁻¹³ suicidal behavior,¹⁴ anti-social behavior,¹⁵ withdrawal from social spaces,⁹ denial and numbing, low self-efficacy, low sense of self, and futurelessness.^{16,17} Poor mental health is also associated with an increase in sexual behaviors that put young people at risk for unintended pregnancies and sexually transmitted infections (STIs) including inconsistent condom and other contraceptive use, multiple partners, and substance use before sex.^{18,19}

In this dissertation I will investigate how perceptions of violence in the community – specifically fear of violence, observation of violence, and personal victimization – relate to adolescent sexual behaviors. I focus on adolescents living in urban, poor settings, and assess the degree to which mental health mediates the relationship between perceptions of violence and sexual behaviors. A further goal is to examine whether the relationship between violence and sexual behaviors differs between two urban, poor settings, Baltimore and Johannesburg. The specific aims are as follows; hypotheses will be discussed in Chapter 2:

Aim #1: Describe the associations between three perceptions of community violence (fear, observation and victimization) and sexual behaviors (sexual activity in the last 12 months and condom use at last sex) among adolescents living in poor areas of Baltimore.

Aim #2: Determine whether depression or PTSD confound the relationships between perceptions of community violence and sexual behaviors among adolescents living in poor areas of Baltimore.

Aim #3: Determine whether associations between perceptions of community violence and sexual behaviors among adolescents living in poor areas differ between Baltimore and Johannesburg.

This series of questions touches on four key areas of the literature on adolescent health: sexual and reproductive health, urban health, childhood and adolescent experiences of violence, and mental health. In chapter 2, I will review the relevant literature in each of these areas, and explain the theoretical underpinnings that guide the conceptual framework for this dissertation. Chapter 3 describes the methodology for these analyses. First, I describe the research design of the WAVE Study – the parent study from which I drew the data for this research. Then I define the study population, the measures used, the analytical approach, and provide a detailed description of the study sites in Baltimore and Johannesburg.

In this dissertation, each aim is addressed in a separate chapter. Due to the repetition in the methods sections, some is not repeated anew in each chapter.

Specifically, chapter 4, which addresses Aim 1, focuses on the relationship between

perceptions of community violence and sexual behaviors among adolescents living in Baltimore. Chapter 5 examines whether mental health confounds the relationships found between perceptions of community violence and sexual behaviors (Aim 2). Finally, chapter 6 (Aim 3) assesses commonalities and differences in the relationships between perceptions of community violence and sexual behaviors among adolescents in Baltimore and adolescents in Johannesburg. Chapter 7 concludes the dissertation with a discussion of the main results, an assessment of the strengths and limitations of the analyses, and consideration of the implications of my findings for future research and policy.

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Chapter 2: Literature Review, Conceptual Framework, and Specific Aims

This dissertation investigates whether perceptions of community violence affect sexual behavior among adolescents. As mentioned in Chapter 1, this process overlaps four areas of the literature on adolescent health: sexual health, urban health, violence, and mental health. In this chapter, I will review each of these literatures briefly and then explain the theoretical underpinnings combined with evidence from the existing literature guided my research questions and shaped the development of my conceptual model. Each section includes quotes from the qualitative phase of the WAVE Study that shed light on how young people, or key informants who work with young people, experience these issues in Baltimore and Johannesburg.

Literature Review

Sexual Health

The onset of sexual activity during adolescence is normative in most countries and is an integral part of the transition to adulthood.¹ Hensel and Fortenberry write "...sexual health has multiple dimensions, including the positive developmental contributions of sexuality, as well as the acquisition of skills pertinent to avoiding adverse sexual outcomes such as unintended pregnancy and sexually transmitted infections (STIs)."² However, while sexual activity in middle to late adolescence is part of normal development, it also brings the potential for exposure to pathogens and unwanted pregnancy.

Everybody having babies. Babies having babies....Yes. That's the major issue. Babies having babies. All these teenage girls getting pregnant and then having babies. (IDI, Baltimore female adolescent)

A lot of STDs... because a lot of unprotected sex. That stems from also people not being able to learn from their parents how to protect themselves and then not going to school to go to health class. Everything leads back to that so there's a lot of STDs, a lot of babies, a lot of sicknesses, a lot of unhealthiness because we're not taking care of ourselves because we haven't learned. (IDI, Baltimore female adolescent)

What's challenging for us as young people living in this community is teenage pregnancy... (IDI, Johannesburg female adolescent)

As reflected in the words of the WAVE Study participants, the contribution of sexual activity to adolescent health is a prominent theme in both Baltimore and Johannesburg. In the current global health context, where childhood infectious diseases are less common, and at an age where chronic diseases have less impact on overall well-being, sexual health is one of the most important health concerns for adolescents worldwide in terms of both mortality and morbidity.³⁻⁵ Early pregnancy, sexual violence, and curable sexually transmitted infections (STIs) contribute disproportionately to the burden of disease during this period of life compared to people in other age ranges.⁶⁻⁹ Many of these outcomes have longer term consequences, affecting an adolescent's future health and social and economic opportunities.¹⁰

Adolescents may suffer more negative sexual health outcomes relative to adults due to a combination of both biological and social processes. First, from a biological perspective, adolescent girls have a higher susceptibility to STI acquisition and are at one of the most fertile periods of the life course.^{11,12} In addition, the development of the frontal lobe of the brain continues into the late adolescent years. The frontal lobe is linked to impulse control, decision-making, and risk-taking, suggesting that adolescents are less fully equipped to plan for engaging in protective behaviors than adults.^{13,14} These developmental realities are exacerbated by the contraceptive methods that teenagers are likely to use. Teenagers are more likely than adults to use condoms or the pill (in contrast

to a long-acting reversible contraceptive – LARC – method or sterilization). As a result, they are using methods that require adherence (as compared to LARCs that are less user-driven) while simultaneously being less capable of planning ahead.^{15,16}

Second, adolescents often navigate complicated social interactions with regards to their sexuality. Adolescents struggle to find people with whom they can discuss their sexual activity and lack information to promote their health and well being.^{17–20} Norms – both perceived and real – from adults and peers can affect adolescents’ sexual activity and risk^{21–23} as well as their ability to learn about and access care and advice.^{24–27} Creating a space for adolescents to access accurate and non-judgmental information – such as in school-based health clinics – is associated with better sexual health outcomes.^{28–30} Adolescents also have a hard time negotiating condom use with a partner – either out of embarrassment, lack of access, low self-efficacy, or the stigma that condoms are a marker of infidelity.^{31,32} Being able to protect themselves is particularly important for girls who are in relationships that have power imbalances – such as girls dating older or abusive men – because norms that promote unequal decision-making, violence, partner concurrency restricts the ability to negotiate condoms.^{33,34}

Finally, economic constraints intersect with these biologic and social forces, reducing access to resources for sexual health and health more generally. Results from the Project Choice study in St. Louis – which made intra-uterine devices (IUDs) free for adolescents – showed that evidenced based counseling coupled with lifting the financial burden of contraceptive use increases uptake of contraceptive methods,³⁵ including long-acting contraceptive methods.^{36–38} Similarly, the Colorado Family Planning Initiative, which subsidized LARCs for low-income residents, saw a substantial state-wide increase

in LARC usage for adolescents associated with a 29% decrease in the expected birth rate for low-income teenagers aged 15-19.³⁹

Some teenage pregnancies provide meaning and/or structure to the lives of adolescents who lack other opportunities^{40,41} – either because they are intended or because they reflect the balancing act of dealing with competing emotions and needs. However, the vast majority are unintended and may alter health and opportunities throughout the life course.^{42,43} Many of these pregnancies – even if the young women report them as intended – are markers of a broader social disadvantage that is related to a lack of opportunity, poor adolescent maternal outcomes, and overall poor health that many of these young men and women face.⁴⁴

Thus, biologic and developmental susceptibility, stigma around sexual activity, and a lack of knowledge and resources lead to greater exposure to unprotected sexual intercourse among adolescents.^{45,46} This greater exposure to unprotected intercourse contributes to higher rates of STIs, unintended pregnancies, and abortions.^{38,47} In many settings an unintended pregnancy, abortion, or early pregnancy can constitute an issue of life and death for young women⁴⁸ while for others and for many young men, it can change the trajectory of their lives.

One area of sexual health where there may be important differences by site is in terms of condom use. There are three important patterns that may drive these differences.

First, in a context of high prevalence of HIV, condom use may be higher either out of an accurate higher perceived risk^{32,49} or following successful public awareness campaigns.^{50,51} In that respect, we would expect condom use to be higher in South Africa.

Second, condom use is negotiated within the context of relationships, and levels

of use are different according to type of relationships. In a context where adolescent relationships are transient, condoms may be used more consistently as risk of STI acquisition increases with a number of partnerships. As relationships become more stable, condoms may be discontinued as a signal of trust in the relationship. In the US, Edin's work shows that in low-income, minority, urban communities, couples often stop using condoms when they reach a certain point of seriousness.^{40,41,52} In this case, non-use of condoms signals greater relational commitment and continuing to use condoms can be associated with the stigma associated with infidelity or a lack of trust in the relationship.⁵³ Characteristics of adolescent relationships is thus an important dimension shaping preventive behavior, as the social meaning of condom use extends far beyond the preservation of health. There is little comparative work on adolescent relationship characteristics across countries, although evidence from the general population suggests that instability of partnerships may be similar in South Africa as in the US⁵⁴ and the fact that condoms may be a marker of infidelity is also common.⁵⁵ Depending on the differences in stability of these partnerships in the two sites we might expect condom use to differ across sites.

Finally, one of the dominant narratives in the condom use literature is that men control condom use decisions and that women have little power of decision on this matter. Underlying this assumption is that women have little agency and are subordinated to their partners' preferences. Edin's work challenges this assumption in low income communities in the US, showing that women exert clear preferences about when to begin and stop using condoms.^{40,41} This may be less the case in South Africa where young women are engaged in sexual partnerships with older men and are more likely to be

exposed to sexual violence.^{56,57} Differences in gender power dynamics in adolescent relationships may thus contribute to different patterns of condom use by site, especially among girls.

Urban Health

Poor health outcomes in adolescence are not equally distributed geographically. A disproportionate burden of disease falls on economically disadvantaged youth, who tend to cluster in socially deprived geographical locations. Disparities in health are particularly striking within urban settings, home to rapidly growing, young populations in many parts of the world.⁵⁸ The growing urban social disparity driving poor health outcomes raises concerns that an urban health penalty is reemerging.⁵⁹ Comments from the adolescents in the WAVE Study, shown below, illustrate how conscious they are of the environments around them.

What I don't like is how overcrowded it is. It's a place with lots of people. It's overcrowded; when you turn on one side, it's full and when you turn another, it's full.
(IDI, 18 year old female, Johannesburg)

A lot of people are either in jail or they moved. We moved because my mother didn't want us to be around there, because a lot of people died, well, got shot. That's why we moved. But other than that, most people are in jail, or they just don't come outside no more. (IDI, 15 year old female, Baltimore)

The concept of an urban penalty for health was initially developed in the late 19th and early 20th centuries, when living in cities was associated with poorer health due to higher exposure to infectious diseases. Even then, disparities in income – e.g. access to safe housing, food, or safe employment – drove health inequalities, but the urban environment was also an equalizer as everyone suffered from contaminated water, poor sewage, and the fast spread of infectious disease. Therefore an urban penalty at that time affected

everyone who lived in a city and it lessened in importance as urban hygiene and city management improved.⁵⁹⁻⁶¹

Today, urban dwellers are on average healthier than their rural counterparts, and affluent urban residents are typically the healthiest members of most nations' populations. However, the heterogeneity of populations in urban settings can be lost when only averages across a given urban setting are looked at and compared. We risk missing the people that suffer from some of the worst health burdens: poor, urban residents. These urban dwellers have some of the lowest incomes while simultaneously being segregated into neighborhoods with fewer resources – human, financial, or social – compared to the neighborhoods that their wealthier peers reside in.⁶² Structural factors – like institutionalized racism or a history of segregation⁶²⁻⁶⁵ – specifically affect neighborhoods where poor, young people live.^{40,41,66,67} In many cities in the developing world, accelerating population coupled with this increasing social deprivation, means that the social and physical environments of urban dwellers are deteriorating at a pace that is hard to respond to with policy and infrastructure development, creating a striking disparity between the health of poor and wealthy urban dwellers.⁶⁸⁻⁷²

These unequal realities shape the norms around gender and sexual activity, and with whom young people have sex. Components of the poor, urban environment in many parts of the world – like high rates of incarceration, migratory labor, unemployment, and drug trafficking – help to drive disparities in sexual health outcomes by creating uneven sex ratios and opportunities for drug use and transactional sex. As a result, sexual networks in many poor, urban neighborhoods include individuals who are at higher risk for STI acquisition – because of sex work or drug use for example.⁷³⁻⁷⁵ These drive

disparities in poor sexual health outcomes; sexual health problems are very common in the poorest urban areas particularly among adolescents.^{76,77} Compared to their wealthier peers, poor urban adolescents are more likely to be diagnosed with an STI, more likely to experience a pregnancy at an early age, more likely to seek an abortion, and more likely to have sexual intercourse with a risky sexual partner⁶⁶ – a pattern visible consistently across time and space.^{66,78–80}

Violence as a Part of Urban Life

Another important aspect of living in a poor, urban environment is chronic exposure to violence, both in terms of one's own victimization and in terms of observing or hearing about violence and victimization in one's community. The respondents in the qualitative phase of the WAVE Study commented on the pervasiveness of violence in their lives.

There ain't nowhere to be safe, tell you the truth. All I'm saying is it's not even safe to even walk around by yourself at a certain time, even though you don't have a curfew. It's not. Three years I got banked [beat up] so many times it doesn't make no damn sense. I got banked too many times, even walking late at night, 3, four o'clock in the morning. Just walking anywhere. (Photovoice, male between the ages of 15 and 19 years old, Baltimore)

It's not safe because, for an example now talking from experience, on Monday I was mugged and they took my cell phone from me and they had a knife and that happened when I was coming back from rugby practice. I was coming there by Shoprite and it was dark and I think it was probably around [8:30 pm] in the evening. So there is crime... (15-year-old male, Johannesburg)

A growing body of work recognizes the important contribution of violence to health and well-being. Violence is the first contributor to Disability Adjusted Life Years (DALYs) in the Americas, and the second worldwide.⁴⁸ Across the economic spectrum, urban dwellers are more likely than rural residents to observe and personally experience violence.^{72–74} Additionally, adolescents are more likely than other age groups to be

perpetrators as well as victims of violence and this pattern stands out starkly for urban, racial/ethnic minority, young men⁸³⁻⁸⁵ as interpersonal violence is the leading cause of male adolescent mortality in the US, and is among the first five causes of mortality for adolescent males globally.⁴⁸

Violence also relates to health indirectly through the loss of educational and professional opportunities, which affect adolescents through their life course. Violence, as both a cause and a consequence of low social cohesion in poor neighborhoods, is associated with depression and PTSD⁸⁶⁻⁸⁸, socio-emotional stability^{89,90}, a fatalistic attitude⁹¹, substance use⁹², quality of schooling⁹³, and weak relationships with adults.^{94,95} These poor health outcomes interact with the reduced resources of growing up poor to limit these young people's long-term economic opportunities.⁹⁶

The links between violence and sexual health are most obvious in the forms of sexual and gender-based violence, which has drawn considerable attention in the last two decades. Recent estimates indicate that 35% of women worldwide have experienced intimate partner violence (IPV) or non-partner sexual violence in their lifetime.⁹⁷ IPV has been shown to be related to an increased risk of STI and HIV acquisition^{98,99} as well as depression, PTSD, and hopelessness.¹⁰⁰

While sexual and gender based violence are clearly at the intersection of violence and sexual health, other forms of violence may also be associated with poor sexual health outcomes. Steiner and colleagues explored this connection using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), showing that youth violence victimization or perpetration were associated with diagnosis of an STI. However, a literature review by Voison et al. develops a conceptual framework linking community

violence exposure and sexual risk-taking – defined as low age of sexual debut, any sexual activity, multiple sexual partners, condom use (inconsistent, improper, or a lack of usage), and the use of alcohol or drugs during sex - but shows that few studies have examined the connection between community violence exposure and sexual health.¹⁰¹

Mental Health

One potential mechanism linking violence and sexual health is mental health. Though few of the young people commented on their mental health, aside from some awareness of stress and coping mechanisms, key informants often linked grief due to violence or deaths with adolescents' mental health.

Well, it seems to me like, well complex...feels like kids here, they've had to grow up, I guess. We had a kid in the Youth Group that was stabbed to death. And so what I realized after that, in trying to process that with the group a little bit, is that they aren't going to go there. They can't dip their finger in grief, because they'll dry out. So what I perceive is this raging storm inside of all... There's a whole population that's not had a chance to deal or process any of this stuff. (Baltimore, Key Informant Interview)

We've done some bereavement workshops with teenagers who've lost their parents. There are differences between the way the guys and the girls process their grief, but I think that once their grief becomes real and they get in touch with their real grief, it's theirs and they begin to deal with it in the same way. (Johannesburg, Key Informant Interview)

Research provides ample evidence of the mental health sequelae of violence exposure, including both mood and anxiety disorders. Adolescents who have either observed and/or been personally victimized by community violence are more likely to experience post traumatic stress,¹⁰²⁻¹⁰⁴ be depressed,¹⁰⁵⁻¹⁰⁷ suffer from suicidal behavior,¹⁰⁸ have anti-social behavior,⁸⁷ withdraw from social spaces,¹⁰³ and internalize their symptoms.^{94,109,110} Another analysis of the data used in this dissertation has also found that both fear of violence and victimization are associated with depression.¹¹¹

In addition, there is likely an association between mental health disorders (particularly depression) and sexual health. Research shows that both depressive symptoms and anxiety are associated with a higher number of sexual partners,^{112,113} nonuse or inconsistent use of contraception,¹¹⁴⁻¹¹⁸ or substance use before sexual activity, which was also associated with engaging in intercourse with a partner who one had not planned to engage in intercourse with.^{112,119} It is also important to note that depressive symptoms may also work in the opposite direction in that depression is associated with lowered libido and less interest in sex.¹²⁰ Thus, whether depression related to violence exposure will increase or dampen sexual activity and protective behaviors is unclear.

While there is an abundance of research linking poor mental health and sexual health, the causal ordering of the two can be particularly difficult to disentangle. Behaviors that may seem like drivers of depression can often be symptoms, such as substance use¹²¹ or STIs.¹²² For example, those who are depressed may engage in riskier sexual behaviors or those who engage in riskier sexual behaviors may become depressed or anxious if those behaviors result in poor outcomes (e.g. an unplanned pregnancy or an STI diagnosis). Sikkema et. al. acknowledge the lack of research pinpointing the specific causal pathways but the conceptual model that they propose suggests that regardless of causal ordering, improving mental health should result in lower exposure to sexual health risks.¹²³

Conceptual Framework and Theories

The sexual health of adolescents living in poor urban settings is thus linked to the urban environment, to community violence, and to adolescents' mental health. I developed a

conceptual framework illustrating these relationships, depicted in Figure 2.1. To develop this framework, I drew on the above literature as well as four sets of theories. I describe the theories here and then discuss how they helped to provide scaffolding for the conceptual framework.

Rational and Symbolic Fear

Elchardus et al.'s theory on the paradigms of rational versus symbolic fear explores how fear is influenced by personal and community narratives as well as one's own victimization or observation of violence.¹²⁴ Being personally victimized or seeing someone else victimized is a frightening, disruptive event. These experiences have been shown to be associated with increased fear;¹²⁵ but fear has also been found to be guided by community narratives of urban decay and social disorder.^{125,126}

This theory suggests modeling three experiences of violence – fear, observation, and victimization – is important for two reasons. First, there are adolescents who are fearful because they have been victimized and others whose fear is informed by the narratives about safety in their communities. Adolescents who are fearful because they have been victimized are likely different from those who have not. It is plausible that fear will be protective for some young people who choose different actions based on a fear that something will happen – not walking through a certain neighborhood or spending time with a certain group of people, for example. However, fear may also influence other behaviors – for example, disengaging from some of the people in their lives. Better understanding whether young people who are fearful – even if they have not seen violence or been victimized themselves – have more negative outcomes adds an

important dimension to violence exposure that has not been explored thoroughly in the literature.

Second, if multiple aspects of exposure to violence in the community affect health outcomes, analyzing a single aspect will not provide a full picture of how violence affects health. Specifically, including only measures of victimization may understate the association between violence and health, as victimization is the least common of these experiences. If fear – which is much more common – is associated with poor health outcomes and fear is caused by higher levels of violence (either experienced personally or in the community) then including it as a measure of exposure is important for understanding how exposure to violence is related to health. Therefore, in all of the analyses I will consider each of the different experiences with violence individually as well as jointly.

Fatalism and Coping

Fatalism and coping are two of the explanations for why depression and PTSD might be associated with subsequent risky sexual behaviors. Adolescents in violent neighborhoods may overestimate their likelihood of dying and be less likely to use protection out of a sense of fatalism that minimizes the benefits of protection.¹²⁷⁻¹³¹ Similarly, adolescents who experience violence may also be more likely to engage in risky behaviors as a coping mechanism.¹³²⁻¹³⁴ These could help the young person deal with symptoms of anxiety or depression (for example marijuana use)¹³⁵ or provide social support (for example engaging in unprotected intercourse with a partner who one trusts to provide support or love).¹³⁶

Both adult social support and substance use may moderate this pathway. Adult social support is associated with better mental health and safer sexual activity after experiences of violence.¹³⁷⁻¹³⁹ Substance use is a coping mechanism for depression and anxiety following violence and is associated with increased unprotected intercourse.^{138,140,141}

Bronfenbrenner's Ecologic Model

Bronfenbrenner's ecologic model describes how adolescents are nested in multiple contexts that all affect their development and behavior.¹⁴² The lowest level, the microsystem, refers to the people, groups, and institutions that are intertwined in a person's day-to-day life – for example, one's interactions with family, classmates, friends, or sexual partners. The second layer, the mesosystem, describes the interrelations between micro-level systems – for example, a child's interactions between home and school. A second component of the mesosystem is the exosystem which describes how multiple microsystems, from which the child is not directly part of, nevertheless interact to affect his or her life, e.g., how a parent's experience at work affects their ability to be present as a parent at home. Finally, the macrosystem describes the broader context that is driven by systems and social structures. For example, gender norms or cultural norms fall in this category.¹⁴²

Thus, adolescent behaviors need to be considered in relation to the social interactions, institutions, and broader social structures in which they live. In this dissertation, I do this by including measures of who raised the respondent, what social support structures they have, what city they live in, and how gender might inform their

behaviors. A lack of significant findings may suggest identifying more specific elements of the ecological model that matter in the lives of urban adolescents.

Structural Theories

The final theoretical approach combines gender and globalization theories to guide our understanding of how social structures shape adolescents' opportunities and experiences. I consider both gender and site (Johannesburg or Baltimore) to be markers of social structure and will explore the ways the association between perceptions of violence and sexual behaviors differ by sex and by site.

It is important to note here that in the WAVE survey, respondents were only asked about their sex, therefore a true gendered analysis is not possible. However, throughout these analyses, I refer to gender for three reasons. First, I consider sex to be a proxy for gender as most young people do not actively differentiate between gender identity and sex. Second, I consider the social meaning of sex rather than the biological understanding of sex as a major driver of adolescent sexual behaviors. Third, sexual intercourse is an outcome in these analyses and referring to gender in the discussion simplified linguistically the discussion of the results.

Gender Theory

West and Zimmerman describe sex as an attribute and gender as a social construction – something that is performed according to social expectations of what it means to be a man or a woman.¹⁴³ Dworkin et al. suggest that “conformity to definitions of masculinity that emphasize adventure, risk-taking, multiple partners, taking sexual opportunities, and

adversarial and inequitable attitudes towards women”¹⁴⁴ may drive some of the behaviors that put adolescents at increased risk for poor sexual health outcomes. For this reason, exploring differences in outcomes and pathways for boys and girls is important. Pooling across gender may dull effects that are specific – or move in different directions – and these gendered differences may be driven by socially structured expectations about how girls and boys “should” behave.

In the data, differences by gender are present across sexual and violence outcomes. In many places, gender differences are found on multiple indicators of sexual health, including age at sexual initiation,¹⁴⁵ number of sexual partners, and condom use.¹⁴⁶ Because of gender-based power dynamics, girls are less likely to negotiate condom use,^{147,148} which combined with their increased biologic susceptibility,¹² exposes them to greater risk of STI acquisition. On the other hand, girls are more likely to access healthcare,²⁰ and seek STI treatment than boys. Gender differences in sexual health behaviors differ across settings, suggesting the importance of gender norms as a social construct in shaping adolescent behaviors. For this reason, exploring gender differences in Baltimore and Johannesburg also captures the different expressions of gender norms across cultures.

There are also gendered experiences of violence. A greater proportion of boys’ lives take place in spaces where the accepted norms of masculinity are associated with visually displaying power⁶³ which results in boys being more likely to be victimized and to observe violence than girls.^{108,149–151} However, girls are more likely to report fear – likely driven by “the fear of sexual victimization, verbal and physical harassment, and sexual exploitation.” Notably, when girls move to places where this fear is lessened, they

experience a greater positive effect on their general health and well-being than do boys.¹⁵²

Finally, there are also gender differences in how boys and girls experience depression and PTSD. Girls are twice as likely as boys to be depressed.¹⁵³ Girls are also more likely to report PTSD symptoms after a trauma and specifically after homicide than boys.^{102,154} Norms around masculinity are hypothesized to affect the relationship between violence and mental health. It is more culturally acceptable for girls to express their emotions – especially ones of sadness or anxiety following violence while boys are expected to be tough.^{155,156} Some research has found that girls who are depressed may be less likely to engage in sexual activity while depressed boys may be more likely to engage in sexual activity.¹²² Shrier et al. hypothesize that girls withdraw in the face of depression while boys use sexual activity as a coping mechanism.^{122,157} These findings justify exploring the gender differences in the role of mental health on the association between violence and sexual behaviors.

Globalization Theory

In her report “Growing Up Global,” Cynthia Lloyd sets out a clear and compelling theoretical framework showing that global trends are affecting local and community based norms and processes.¹⁵⁸ She suggests that this similarity in norms and processes may affect the experiences of adolescents around the world so that they are becoming increasingly similar – especially those at either end of the economic spectrum. In other words, the wealthiest teenagers in the US or South Africa may experience similar good health and abundant opportunities while the least well off and most vulnerable may experience poor health outcomes.

This theory of increasing similarities across disparate contexts justifies a comparison of the experiences of adolescents in two cities. The cross-site comparison is an opportunity to compare and contrast the ways urban violence relates to sexual health in two poor, violent, urban communities in two different countries: the US and South Africa. Baltimore and Johannesburg are structurally similar in important ways. Poverty, high levels of urban violence, and a history of institutionalized racism and housing segregation characterize both cities. Some of the macro-level contextual influences – such as low employment, high incarceration rates, and high partner concurrency – are also similar in both cities.

Initial analyses of the WAVE data showed that Baltimore and Johannesburg are more similar to each other than to any of the other sites included in the study (which were Ibadan, Nigeria, New Delhi, India, and Shanghai, China). Adolescents in these two cities reported similarly high rates of observing violence in their neighborhoods and experiences of personal victimization¹⁵⁹ and higher proportions of adolescents were sexually experienced.^{160,161} Results from analyses of the qualitative data about violence and sexual health were similar with respect to adolescent's pervasive fear and experiences of violence throughout their lives.¹⁶² If results are similar across gender and site, this would support the notion that links between violence and sexual health reflect common psychological underpinnings in poor, violent, urban settings.

However, there are also important differences between the two sites – especially when discussing sexual and urban health. The US – a wealthier country with a more stable, diverse economy – has more opportunities and more flexibility for young people who can access education and employment opportunities. The US also offers young

people more opportunities to move throughout the country. South Africa has a much more liberal constitution guaranteeing a multitude of rights that should protect and help the very poor – including rights to healthcare, education, food and clean water, housing, gender non-discrimination, and labor rights. However, effectively providing for these rights has proved a challenge to all South African governments since the end of Apartheid. In addition, in South Africa, the burden of disease related to the HIV epidemic is much greater than in the US and stronger gender norms around masculinity and sexual violence help fuel the epidemic putting young people at risk for other STIs and unintended pregnancies.

Gender dynamics in the two sites also differ. Being a young woman in South Africa is a much more dangerous reality – where a quarter to half of all women experience intimate partner violence.¹⁶³ Jewkes and Morrell suggest that “the dominant ideal of black African manhood emphasizes toughness, strength and expression of prodigious sexual success” and that, importantly, this is a sense of masculinity that women themselves are attracted to. Gender norms that prioritize masculine control and feminine submission drive violence in partnerships.¹⁶⁴ This may differ greatly from gender roles in low-income urban American communities where young women have more power in relationships.⁴¹ Sexual violence – though by no means absent – is not as common and sexual risk is more often driven by concurrent partnerships.¹⁶⁵ If the associations between violence and sexual behavior differ between the two sites, this will underline the importance of structural factors (gender norms, cultural factors, environmental exposures (HIV)) in shaping the processes related to adolescent sexual behaviors in poor, violent, urban settings.

Conceptual Framework

Building on these theories and the literature reviewed earlier, in this dissertation I use the conceptual framework depicted in Figure 2.1 (shown at the end of the chapter) to extend the current literature on adolescent sexual health. First, I explore the ways perceptions of community violence are related to adolescent sexual behavior outcomes, explicitly considering multiple experiences of violence. Second, I test whether mental health, as measured by depression and PTSD, confounds the relationship between violence and sexual behaviors; that is, I assess the extent to which violence affects sexual behavior through its influence on mental health. It is important to note that this is cross-sectional data so though I conceptualize this relationship as one of mediation – and show it pictorially as such – I can actually only assess the results for evidence of confounding. The difference here is entirely conceptual – how one believes the associations work – while the statistics remain the same as timing cannot be determined. Essentially, a variable is considered to be a mediator if it is believed to be on the pathway between the exposure and the outcome. In this case the question is whether violence affects one’s mental health negatively, which in turn increases sexual risk-taking. In contrast, a confounder is believed to be a third variable that affects both the exposure and the outcome. Without data on timing I can only assess confounding in these analyses. Finally, I provide an understanding of how social structures affect these relationships, by exploring differences by gender and differences by site.

Building on Elchardus et al.’s theory about rational versus symbolic fear, I conceptualize three different constructs of violence – fear, observation, and victimization. Though I can not differentiate between fear caused by experiences of violence and fear

caused by community narratives and responses to violence, exploring multiple types of experiences of living in violent neighborhoods is a new direction in this literature. All three may have direct effects on subsequent behaviors. I use the literature about sexual and urban health, and focus on two outcome variables: one that is hypothesized to be normative in the transition to adulthood and not necessarily risky (sex in the last 12 months) and a second that is more directly related to negative health outcomes (a lack of condom use at last sex).

Research and theory about fatalism and mental health suggests that they may play an important role in the link between violence and sexual behavior. I thus hypothesize that depression and PTSD may act as mediators in the relationship between perceptions of violent experiences and sexual behaviors. It is important to note again that though they are conceptualized as mediators, I can only test them as confounders because temporality is unspecified in the WAVE study, which is cross-sectional. From now on I will refer to these as confounders in order to be consistent in language. Though fatalism is another potential mediator and may also be important, the sample size was too small to explore fatalistic attitudes.

Finally, Bronfenbrenner stresses the importance of macrosystems, which consist of the broader social and physical contexts that people live and operate. Here I examine two characteristics of macrosystems: context and gender, which I measure by site and sex. Site represents differences between Baltimore and Johannesburg that I described above. The site characterizes the cultural and behavioral norms that shape how people interact and the economic opportunities that young people have in both cities. Similarly, gender norms shape how young people expect to engage with others, their own sexual desires,

and how and where they *want* to engage in those sexual behaviors. By stratifying by site and gender I test for systematic differences by gender in each site.

Specific Aims and Hypotheses

As discussed in the literature review, the onset of sexual activity is hypothesized to be normative in the transition to adulthood, and occurs during adolescence in both settings. In the absence of information related to sexual satisfaction, consensual sex, or frequency of sexual activity, there is no opportunity to distinguish between the positive as opposed to the negative experiences of sexual activity. Therefore, sex in the last 12 months is considered to be neither a risky behavior nor is it considered a positive measure of young people's sexuality. This guided my hypothesis that there would be little variation in sexual activity in the last 12 months by violence exposure.

Conversely, a lack of condom use is considered to be a risky sexual behavior in the context of high rates of STI transmission and unintended pregnancy. Other measures of contraceptive use were not considered in the analysis, as the survey did not include information about the type of method used or whether the young person intended to get pregnant. As condoms are by far the most popular method used in these populations,¹⁵ the study of any method of contraception is similar to the study of condom use (only 15-20 contraceptive users in either site were using another method and not using condoms).

Therefore, I organize my analysis around three specific aims and the hypotheses are based on expected differences in sexual behaviors by violence exposure.

Aim #1: Describe the associations between three perceptions of community violence (fear, observation and victimization) and sexual behaviors (sexual activity in the last 12 months and condom use at last sex) among adolescents living in poor areas of Baltimore.

Hypothesis 1.1: Respondents with different perceptions of violence will be similarly likely to engage in sexual activity.

Hypothesis 1.2: Respondents with higher perceptions of community violence will be less likely to have used condoms at last sex.

Hypothesis 1.3: Males will be more likely to engage in sexual activity than females regardless of perceptions of violence.

Hypothesis 1.4: Females with higher perceptions of community violence will be less likely to use condoms than males with the same perceptions.

Aim #2: Determine whether depression or PTSD confound the relationships between perceptions of community violence and sexual behaviors among adolescents living in poor areas of Baltimore.

Hypothesis 2.1: Violence will be associated with higher levels of depression and PTSD among both boys and girls.

Hypothesis 2.2: Among both boys and girls, depression and PTSD will be associated with more sexual activity and will confound the relationship between violence and sexual activity.

Hypothesis 2.3: Among both boys and girls, depression and PTSD will be associated with less condom use, but the relationship will be stronger (i.e., more negative) among girls.

Hypothesis 2.4: Depression and PTSD will confound the relationship between violence and condom use among both boys and girls.

Aim #3: Determine whether associations between perceptions of community violence and sexual behaviors among adolescents living in poor areas differ between Baltimore and Johannesburg.

Hypothesis 3.1: There will be similar associations between perceptions of violence and sexual behavior by gender across site.

In the next chapter I will discuss the WAVE Study, define the variables used in the analyses, and describe statistical methods used to test the hypotheses.

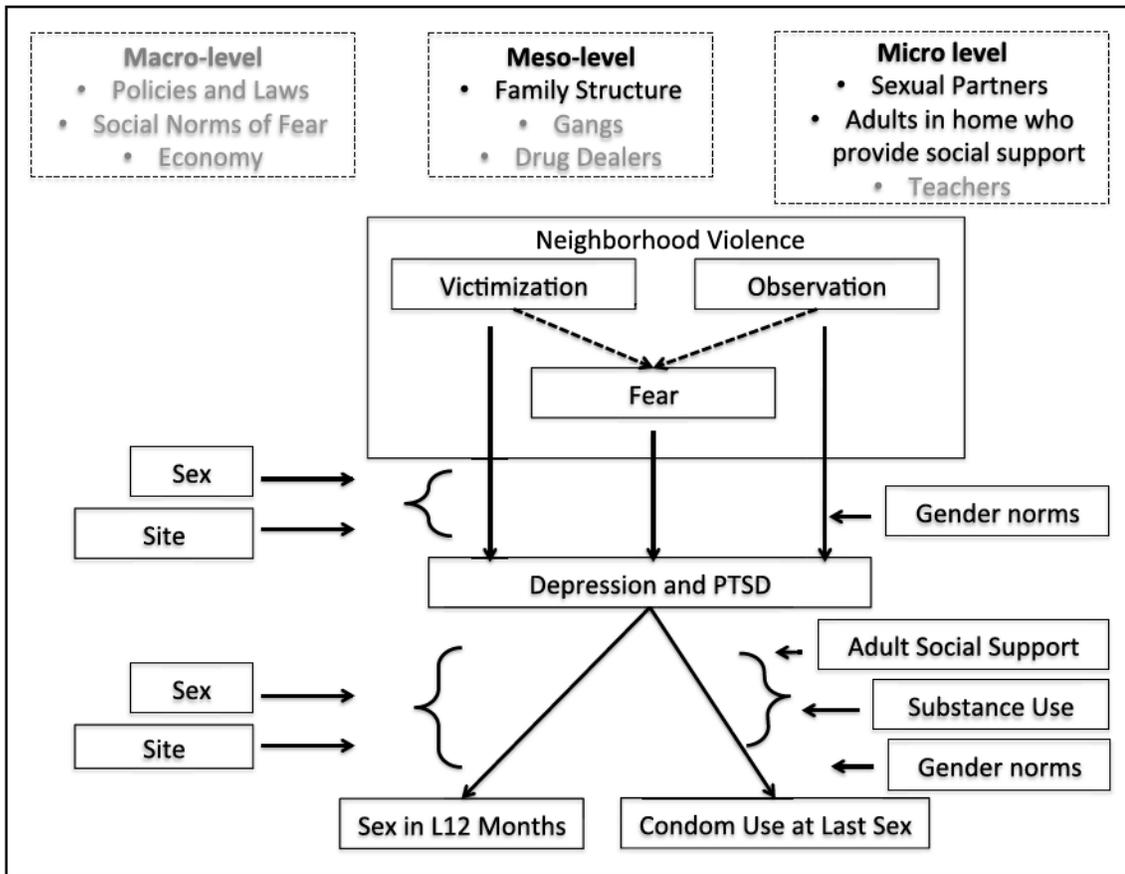


Figure 2.1: Conceptual Framework

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Chapter 3: Methods

The Well-Being of Adolescents in Vulnerable Environments Study

The data for this dissertation come from the Well-being of Adolescents in Vulnerable Environments (WAVE) Study, a two-phased study of adolescents aged 15 to 19 years in five urban sites around the world. The overall goals of the WAVE Study were to understand the health of adolescents in poor, urban environments and the factors preventing them from obtaining knowledge about or care for their health issues. The study focused on five domains of health salient to adolescents: sexual and reproductive health, mental health, social and physical environments (including experiences of violence), substance use, and healthcare access. The Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health as well as ethics boards in each of the international sites reviewed and approved all study protocols.

The WAVE Study made an explicit attempt to focus on vulnerable youth. A priori, the belief was that many youth in poor, urban environments were vulnerable because of their low income and social capital, the latter driven by their young age and lack of educational and/or professional opportunities as well as a pattern of low social capital in their neighborhoods. Five urban locations were selected for the study: Baltimore, USA; Ibadan, Nigeria; Johannesburg, South Africa; New Delhi, India; and Shanghai, China. These sites were chosen because they are all urban settings with significant portions of their populations living in poverty. The sites also represent a diversity of cultural, religious, and social contexts in which poor, urban youth live around the world.

There were two phases of the study. Phase 1 was a qualitative exploration of how adolescents defined health/ill health and the community context of adolescent health-

seeking behavior. Data collection was conducted between June and August of 2011 and included in-depth interviews with adolescents and key informants and focus groups anchored around either a community mapping or photovoice exercise. An example of one of the community maps is shown in Figure 3.1 (all figures are shown at the end of this chapter), and sample photos from the photovoice project are depicted in Figures 3.2 and 3.3. Findings from Phase 1 suggested that the adolescents were more concerned with their social and physical environments than access to healthcare; therefore, Phase 2 of the study focused on the interrelations between the social and physical environments and adolescent health outcomes.^{1,2} Phase 2 consisted of a quantitative survey conducted between May and September of 2013 in all five sites. The quantitative study was organized around three aims:

- 1) Describing the health of disadvantaged youth, with a focus on the four domains of health salient to adolescents listed above.
- 2) Determining the factors that influence each of the four health domains, with a specific focus on different forms of capital: physical, human, financial, social, and cultural.
- 3) Comparing the determinants of adolescent health and related factors across the five sites.

The WAVE Study data are uniquely suited to address the aims of this dissertation because adolescents were asked in the survey about experiences of violence, sexual health, and mental health. In turn, the dissertation addresses all three aims of the WAVE

Study, with a focus on violence exposure and sexual health behaviors. Only data from the quantitative survey will be used in analyses. Based on theoretically derived hypotheses as well as the distribution of key predictors and outcomes, two sites are examined and compared – Baltimore, USA and Johannesburg, South Africa.

Respondent Driven Sampling

Adolescent respondents were sampled for the survey using respondent-driven sampling (RDS). RDS combines a chain referral procedure (where participants recruit other participants) with statistical modeling to account for potential biases in the resulting network clusters. The assumption underlying RDS is that all individuals in the target population are interconnected through a small number of intermediaries.³ Initial “seeds” are interviewed, and then asked to bring in friends or acquaintances that are eligible for the study. Participants are offered a primary incentive to participate themselves and a secondary incentive for recruiting their peers. Although the initial seeds are not randomly selected, RDS aims to produce a final sample independent of initial participants and representative of the broader population.⁴ Figure 3.4 gives a visual depiction of the chains, and will be explained in more detail below.

RDS is increasingly being used to recruit hard-to-reach populations potentially excluded from traditional sampling methods. A specific focus hard to reach youth because they were out of school, unstably housed, or (legal or illegal) migrants informed the decision to use RDS in all five sites. Traditional school-based or household sampling frames might have disproportionately excluded groups of youth we hoped to study.⁵

Weighting strategies can be applied to RDS samples to account for differential probabilities of being sampled, making the sample representative of the underlying population. The weighting can be done in one of two ways. The RDSI estimator uses an assumption of homophily whereby people are assumed to be more likely to recruit people who resemble them. Homophily is assessed by evaluating how likely each person is to recruit similar individuals – based on any variable that is collected. Age, sex, and other demographic characteristics are usually considered, although behavioral characteristics can also be used to create this type of weight. Subsequently, weights are calculated so that homophily is equal across each of the variables of interest.⁶ One limitation of this strategy is that weights are variable-specific and therefore calculated separately for each analysis. This is time consuming and problematic for comparing results across outcomes. Although not an issue in this dissertation, the method also should not be applied to continuous outcomes.^{6,7}

An alternative weighting strategy – the RDSII estimator – creates weights based on each respondent's network size, as an indicator of an individual's probability of being selected in the sample.⁴ Specifically, information about the number of individuals in each participant's network is collected, and used to estimate the probability that a given participant would have been nominated by their network connections.⁷ An individual's weight corresponds to the reciprocal of the number of people in his/her network.⁷ This parallels weighting procedures used with traditional probability sampling.

RDS samples may cluster around the initial seeds, such that individuals recruited within one chain are more similar to each other than to other members of the sample. In

order to account for interdependence between individuals recruited in the same chain, a cluster effect around the original seed is included in the analysis.

Respondent Driven Sampling in the WAVE Study

Sampling procedures for all five sites in the WAVE Study were the same. The first step in RDS samplings is to identify target geographic areas. The team focused on areas of the cities that were particularly vulnerable and low-income. In Baltimore, for the qualitative phase the team began with a review of teen birth rates in Baltimore City and identified 8 areas with teen birth rates higher than 110 births per 1000 females aged 15 -19 in 2007. They then looked at a housing market typology that the Baltimore City Planning Department created in 2008 and identified 12 areas that were identified as distressed housing markets. Finally, they isolated the 10 areas with the highest number of homicides in 2008 and 2009. Through this process the team narrowed 55 community statistical areas down to 16 that were highly disadvantaged. Four areas of Baltimore were represented in these 16 areas and because the School of Public Health is in East Baltimore and research relationships already existed with partners in the area, it was chosen as the focus for the qualitative phase. For the quantitative survey, this area was expanded to the five zip codes that included these areas in East Baltimore.

In Johannesburg, Hillbrow – a neighborhood within the city near the central business district – was selected because HIV prevalence in South Africa is highest in urban informal areas, and Gauteng (the province in which Johannesburg is located) has among the highest rates of HIV infection in the country.⁸ The head offices of the Wits Reproductive Health and HIV Institute (WRHI) – our academic partners in South Africa

– are located in Hillbrow. The institute has a long-standing engagement with this community and with health services in the area.

The second step in the RDS sampling for the quantitative phase was to select “seeds” for the sample. Within the target areas, youth between the ages of 15 and 19 years of age were eligible for inclusion in the WAVE Study. Seeds had to live in the designated areas and meet the age eligibility criteria. In addition, they had either 1) stood out during the qualitative phase as particularly well networked or 2) were recommended by key informants from local youth serving organizations. After eligibility was confirmed and informed consent was given (including parental consent for youth younger than 18), individuals who served as “seeds” completed a 20-30 minute survey using ACASI software on a laptop. The surveys were conducted in local languages (e.g., English in Baltimore and English, isiZulu, and seSotho in Johannesburg) and respondents could either read the questions or listen to them on headphones. Staff on the survey team explained how the computer worked before respondents started and anyone who needed assistance during the survey could raise their hands to ask questions.

The third step in the RDS sampling, following completion of the survey, was to provide individuals acting as seeds with up to three “coupons” and ask them to give them to friends or acquaintances eligible for the study. Adolescents who lived in the eligible areas, were age-eligible, came into the study site with a coupon to be interviewed, and provided consent (and parental consent if younger than 18) were included in the study. These new recruits were also issued coupons and the process continued until the desired sample size was achieved.⁹ Figure 3.4 depicts the “chain” referral procedure that was

created from the (green) seed to the (blue) network connections. This is not a full chain but is a snapshot of an early chain shown here as an example.

Youth were given a primary incentive (US\$20 in Baltimore and 100 rand – approximately \$9.30 – in Johannesburg) for their participation in the survey as well as a secondary incentive (US\$10 in Baltimore and 10 rand – just under \$1.00 – in Johannesburg) for each friend who successfully completed the survey. Thus, respondents earned up to US\$50 in Baltimore and 130 rand in Johannesburg for their participation in the WAVE Study.

In both Baltimore and Johannesburg, boys responded more positively to the RDS recruitment design than girls. After reaching half to two thirds of our IRB approved sample of 500, there were nearly twice as many boys as girls. As a result, we changed our recruitment strategy in both sites, instructing respondents to only recruit girls until the end of the survey. Logistically, this was done by telling respondents that their coupons were only valid for girls. This corrected for the gender imbalance, but suggests that the assumption that RDS recruits a representative sample of the underlying population may not hold in adolescent populations in urban poor environments with regards to gender. Future research is needed to better understand these dynamics. Further details on the success of this strategy in the WAVE Study as a whole are published and available elsewhere.¹⁰

The WAVE Study Questionnaire

The survey collected detailed information in five major domains – sexual and reproductive health, physical and social environments, mental health, substance use, and

healthcare resources and access. Adolescents were asked about people in their lives including, adult caregivers, teachers, role models, and peers. They were also asked about the circumstances and contexts of their lives including the built environment and personal experiences with schooling and work. The questions were presented in five separate modules over approximately 20-30 minutes on an ACASI (Audio Computer Assisted Survey Instrument) survey. The first module included questions on background information and demographic characteristics as well as social support and job histories. The second module was about violence and neighborhood factors including physical environment characteristics. The third module was about substance use. The fourth module covered sexual and reproductive health questions. The final module covered mental health as well as health care access.

Dependent Variables

Based on the available information in the WAVE Study, two outcome variables were used in the analyses to characterize sexual behaviors:

- SEX_L12, coded as a dichotomous variable, measured whether the respondent had had sexual intercourse in the last 12 months, and
- CONDOM_LAST_SEX, coded as a dichotomous variable, measured whether the respondent had used a condom at their last sexual encounter (in the last year).

These questions were included in the section on sexual and reproductive health in the survey instrument.

Sexual intercourse in the last 12 months was asked of all respondents.

Respondents (six males and four females in Baltimore; seven males and one female in Johannesburg) were dropped from analyses if they were missing answers to the question about sex in the last 12 months. In Baltimore and Johannesburg 302 (of 446) and 259 (of 488) respondents reported sexual activity in the last 12 months, respectively. Analyses of condom use at last sexual intercourse were restricted to this sub-sample. In Baltimore, 22 respondents whose last sexual act occurred in the last 12 months were missing information on condom use, resulting in an analytical sample of 280 respondents (177 males and 103 females). In Johannesburg, eight respondents whose last sexual act occurred in the last 12 months were missing information on condom use, resulting in an analytical sample of 250 respondents (150 males and 100 females). The distributions of both of these dependent variables by site and gender are provided in Table 3.1.

Table 3.1: Percentage Reporting Sex in the Last 12 Months and Condom Use at Last Sex, by Gender				
Baltimore and Johannesburg Samples, 2013 WAVE Study				
	Baltimore Females	Johannesburg Females	Baltimore Males	Johannesburg Males
Sex in the Last 12 months	54.7 (109)	48.7 (103)	72.2 (193)	54.2 (156)
Condom Use at Last Sex	49.9 (50)	76.4 (76)	60.7 (102)	70.6 (108)

Percentages are weighted; unweighted Ns shown in parentheses.

Independent Variables

Fear of community violence in the last 12 months was a binary measure constructed from an additive scale of six items that asked about fear during the day, evening, and daily activities. The scale ranges from 0 to 18, as there were four answer choices coded from 0

to 3 for each of the items (see Table 3.2). Higher values indicate higher levels of fear in the previous 12 months. For the binary measure, respondents scoring a 3 or higher on the full measure were coded 1, and all others coded 0. This cutoff was chosen as people categorized as “fearful” met the following criteria:

- Individuals who responded “very fearful” on at least one of the items
- Individuals who responded “somewhat” fearful on two or more items
- Individuals who responded “a little fearful” on three or more items
- Individuals who responded “somewhat fearful” and a “little fearful” on at least one item each

This cutoff allows individuals who responded “somewhat fearful” on one item or “a little fearful” on two items to be categorized as having no fear. It is important to note that this does not differentiate between always being fearful of one thing and a chronic low-level of fear of several different things. Exposure to chronic or acute violence may result in different outcomes; however this issue is not addressed here.

Table 3.2: Questions Included in the Fear of Violence Scale WAVE Study Questionnaire, 2013	
Scale Range: 0-18, higher values indicate more fear	
Questions Included in Scale	Answers
How afraid are you: - of being attacked or robbed when you are out with other people in your neighborhood at night? - of being attacked or robbed when you are out alone in your neighborhood at night? - when you are on the street in your neighborhood during the day? - in your neighborhood when you are on your way to school or work? - when you are at school or work? - when you are at home in your house or apartment?	0=Not at all 1=A little fearful 2=Somewhat fearful 3=Very fearful

Observation of community violence in the last 12 months is a binary measure constructed from a scale of seven items that asked about different experiences in one's neighborhood that ranged from potentially common events, such as observing an arrest, to more extreme events, such as seeing someone shot. Factor analysis of this scale suggested that two items about violence in the home (having one's home broken into or having weapon in the home) were explained by a second factor and thus these items were excluded from the scale.

There were three answer choices for each of the items (see Table 3.3), which were coded from 0 to 2. The scale ranges from 0 to 14, with higher values indicating that the respondent had observed more violence and/or more types of community violence in the previous 12 months. The binary variable was constructed with a cutoff point of 4. The cutoff for the binary variable was conceptualized differently than fear in that observing only one category of violence frequently was not categorized as "observing" because several of these events are likely very common in these neighborhoods – e.g. arrests, drug deals or gangs – and categorizing these observations alone created little differentiation in the score. This cutoff was chosen on the basis that individuals were categorized as "observing" if

- they observed two or more types of violence "a lot," or
- they observed more than three types of violence "rarely."

This allowed for individuals who observed either two or fewer types of violence "rarely" or one type of violence "a lot" to be categorized as not observing violence. It is important to note again that the measure does not differentiate observing several events rarely versus one event often.

Table 3.3: Questions Included in the Observation of Violence Scale WAVE Study Questionnaire, 2013	
Scale Range: 0-18, higher values indicate more observation	
Questions Included in the Scale	Answers
In the past 12 months how often did you/your: - hear guns being shot in your neighborhood? - see somebody get arrested in your neighborhood? - see drug deals in your neighborhood? - see gangs in your neighborhood? - see someone being beaten up in your neighborhood? - see somebody in your neighborhood pull a gun, knife, or other weapon on another person? - see someone get killed in your neighborhood?	0= Never 1= Once 2= More than once

Finally, *victimization* through community violence in the last 12 months is a binary measure constructed from a scale of five items about experiences of personal victimization – from being pushed, shoved or verbally threatened to being threatened or physically assaulted with a weapon. There were three answer choices for each of these items (see Table 3.4), which were coded from 0 to 2. The scale ranges from 0 to 10; higher values indicate that the respondent had been victimized more times and/or in different ways in their neighborhood in the previous 12 months. The cutoff point for this scale was set at 1 so that the categorization is never experiencing any of these events versus ever experiencing one or more. Few respondents had multiple experiences of victimization and they are not distinguished in the binary measure.

Table 3.4: Questions Included in the Victimization in Neighborhood Scale WAVE Study Questionnaire, 2013	
Scale Range: 0-10, higher values indicate more victimization	
Wording of Included Questions	Answers
In the past 12 months how often were you:	0= Never 1= Once

<ul style="list-style-type: none"> - pushed, grabbed, or shoved by someone in your neighborhood? - hurt in a fight in your neighborhood? - threatened verbally in your neighborhood? - threatened with a gun, knife, or other weapon in your neighborhood? - shot by a gun, stabbed with a knife, or hurt with another type of weapon in your neighborhood? 	2= More than once
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Table 3.5 below shows the mean values for each scale. Histograms of the distribution of each scale by site and gender are shown in Figures 3.9-3.11 at the end of the chapter; the lack of normality in the distribution of these scores justified turning these variables into binary measures. However, in all four groups the range of answers from respondents covers the whole scale (0-18 for fear; 0-14 for observation; 0-10 for victimization).

Table 3.5: Mean of Fear, Observation and Victimization Scales, by Gender Baltimore and Johannesburg Samples, 2013 WAVE Study				
	Baltimore Female	Johannesburg Females	Baltimore Males	Johannesburg Males
Mean Fear Scale (0-18)	5.4 (0.36)	6.4 (0.1)	3.11 (0.17)	5.3 (0.32)
Mean Observation Scale (0-18)	5.9 (0.28)	6.4 (0.2)	6.2 (0.27)	8.0 (0.24)
Mean Victimization Scale (0-10)	1.1 (0.15)	1.1 (0.06)	0.77 (0.08)	2.3 (0.16)

Weighted means are shown and weighted standard errors are shown in parentheses.

These measures evaluate three *perceived* experiences of violence. By including each of these measures independently as well as together, I am able to explore whether each is an independent construct associated differently with each of the outcomes. It is important to note that there is overlap between these three experiences. For example, some people who are fearful have also observed violence or been victimized. This overlap is shown in Figures 3.12a (Baltimore) and 3.12b (Johannesburg). Out of concern

that correlations across these variables might be too high (>0.4), correlations are shown below in Table 3.6. None exceed 0.4.

Table 3.6: Correlation of Victimization, Observation, and Fear of Violence Variables		
Baltimore and Johannesburg Samples, 2013 WAVE Study		
<u>Baltimore</u>		
	Observation	Victimization
Fear	0.1469	0.2234
Observation	--	0.2373
<u>Johannesburg</u>		
	Observation	Victimization
Fear	0.1942	0.1404
Observation	--	0.3603

Covariates

I adjust for a number of socio-demographic and other individual characteristics in the analyses. The theoretical justification for including each of these factors was discussed in the previous chapter, and their relationships with violence and sexual behavior illustrated in the conceptual framework.

Age (categorized as 15 and 16 versus 17 and older), alcohol use in the last month (yes/no), who raised the respondent (two parents versus other), and norms about masculinity (yes/no to the question: a male should be physically tough) were all included as binary measures. In the condom use models a variable indicating partner type at last sex was also included (this was not included in the sex models because some people had never had sex). The variable was categorized as being in a relationship (e.g. married, boyfriend) versus other (e.g. classmate, one night stand etc.). Finally, social support was

captured by a scale that asked the adolescent about the presence of an adult (asked separately for both male and female adults) who provided social support to them. Table 3.7 summarizes the questions used in the construction of the social support variables. The cutoff point for the binary variable was 4, corresponding to the middle of the scale.

Table 3.7: Questions Included in the Adult Social Support Scale WAVE Study Questionnaire, 2013	
Scale Range: 0-9, higher scores indicate more social support	
Wording of Included Questions	Answers
<p>How true are the following statements about a fe/male adult presently in your home?</p> <ul style="list-style-type: none"> - There is and adult fe/male who believes you will be successful. - There is an adult fe/male who you can turn to with a problem - There is an adult fe/male who listen to what you have have to say 	<p>0 = Never True 1 = Sometimes True 2 = Often True 3 = Always True</p>

Two measures of mental health are included in Chapters 5 and 6 as potential confounders between violence measures and sexual behaviors: the Center for Epidemiological Studies in Depression (CESD-10) scale that measures depression and the Department of Veteran’s Affairs’ (the VA’s) Post Traumatic Stress Disorder (PTSD) Civilian’s Checklist. The depression scale is a modified version of the standard CES-D that includes 10 items related to the frequency with which the respondent has felt certain emotions in the past week.¹⁴ The depression scale had four answer choices for each of the 10 items (see Table 3.8), coded from 0 to 3. The scale ranges from 0 to 30, with higher values indicating more depressive symptoms in the week prior to the survey.

Table 3.8: Questions Included in the Depression Scale	
WAVE Study Questionnaire, 2013	
Scale Range: 0 – 30, higher scores indicate more depressive symptoms	
Wording of Included Questions	Answers
<p>In the past 7 days, how often have you felt or behaved in the following ways?</p> <ul style="list-style-type: none"> - You were bothered by things that usually don't bother you in the past 7 days - You had trouble keeping your mind on what you were doing in the past 7 days - You felt depressed in the past 7 days - You felt that everything you did was an effort in the past 7 days - You felt hopeful about the future in the past 7 days [<i>Reverse coded</i>] - You felt fearful in the past 7 days - Your sleep was restless in the past 7 days - You were happy in the past 7 days [<i>Reverse coded</i>] - You felt lonely in the past 7 days - You could not get "going" in the past 7 days 	<p>0 = Rarely or none of the time (less than 1 day) 1 = Some or a little of the time (1-2 days) 2 = Occasionally or a moderate amount of the time (3-4 days) 3 = Most or all of the time (5-7 days)</p>

The PTSD scale measures whether the respondent experiences symptoms of Post-Traumatic Stress Disorder. The full PTSD measure consists of 17 items about how experiences in the past affect one's coping today; scoring is based on the PTSD Civilian's Checklist, which has been tested and validated in civilian populations.¹⁵ In Baltimore the full 17-item list was used, while in Johannesburg, a modified version, consisting of only six questions, was included. Different versions were used because each site was able to include approximately 10 minutes worth of site-specific questions. Baltimore prioritized the entire PTSD scale in its site-specific questions while Johannesburg chose to emphasize sexual and reproductive health questions and shortened the PTSD scale. The shortened version has five answer choices for each of the first six items (see Table 3.9), which were coded from 0 to 4. In both versions, the higher the score the more stress the

respondent reported in the previous 30 days. Table 3.9 shows the survey questions used in the construction of this variable.

There is no set cut off point for the scale; a cut off is typically calculated based on the believed underlying distribution in the population. Therefore, the scale is scored differently in different settings. The Department of Veteran's Affairs (the VA) writes:

“Generally, the lower the prevalence of PTSD in a given setting, the lower the optimal cut-point. In settings with expected high rates of PTSD, such as specialty mental health clinics, consider a higher cut-point. In settings with expected low rates of PTSD, such as primary care clinics or circumstances in which patients are reluctant to disclose mental health problems, consider a lower cut-point.”¹⁶

In specialized clinics or VA primary care settings where PTSD is likely to be frequent, a cutoff that allows 16-39% of the population to have PTSD is generally recommended.¹⁶

One study in an outpatient setting at Cook County's Hospital in Chicago found that 42% of their respondents reported symptoms of PTSD – most often related to gun violence.¹⁷

In order to use a slightly more conservative measure while still remaining in line with the VA's recommended distribution I used a cutoff point of 36 for Baltimore and 16 in Johannesburg. If PTSD were actually more common (and we have false negatives in the first measure), this would result in attenuation in these findings. If the second measure is correct, we would expect stronger relationships than we see in our results. Using these cutoff points, the percentage of respondents who report PTSD symptoms is around 35% in both samples. Sensitivity analyses using a higher cutoff point (of 49 in Baltimore and 20 in Johannesburg) were conducted, which will be discussed in Chapters 5 and 6.

Table 3.9: Questions Included in the PTSD Scale WAVE Study Questionnaire, 2013	
Scale Range in Baltimore: 17-85 Scale Range in Johannesburg: 6-30 Higher Scores indicate more trauma symptoms in the last 30 days	
Wording of Included Questions	Answers
<p>Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. In the past 30 days, how much did you</p> <ul style="list-style-type: none"> - suddenly act or feel like a stressful experience was happening again (like you were reliving it)? - feel very upset when something reminded you of a stressful experience from the past? - lose interest in things that you used to enjoy? - feel emotionally numb or unable to have loving feelings for people close to you? - feel like your future would be cut short somehow? - have difficulty concentrating? <p><i>The following questions were only asked in Baltimore:</i></p> <ul style="list-style-type: none"> - have repeated, disturbing memories, thoughts or images of a stressful experience in the past? - have repeated, disturbing dreams of a stressful experience in the past? - have physical reactions (e.g. heart pounding, trouble breathing, or sweating) when something reminded you of a stressful experience from the past? - avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it? - avoid activities or situations because they remind you of a stressful experience from the past? - have trouble remembering important parts of a stressful experience from the past? - feel distant or cut off from other people? - have trouble falling or staying asleep? - feel irritable or have angry outbursts? - were you "super alert" or watchful on guard? - feel jumpy or easily startled? 	<p>1 = Not at all 2 = A little bit 3 = Moderately 4 = Quite a bit 5 = Extremely</p>

Internal Consistency Measures of All Scales

The Cronbach’s alpha coefficients shown in Table 3.10 are indicators of each scale’s internal consistency and reliability. All of the violence scales were modified versions of scales in the CDC’s Compendium of Assessment Tools on Youth Violence, and all of them were developed for use in US research settings.¹⁸ Thus, they may not accurately measure the underlying latent constructs in international settings. The other scales also were not developed in the South Africa setting, therefore testing for internal consistency was important. Accordingly, the alphas were calculated separately for each site, for the whole sample, and for boys and girls separately, to test whether the scales performed similarly in each context. As indicated in Table 3.10, all but one scale (depression for females in Johannesburg) had alpha coefficients above 0.75. Fear performed slightly less well for both males and females in Johannesburg though still had an alpha above 0.75; the victimization scale was just below 0.8 for males in Johannesburg. This indicates high internal consistency across site and gender.

Scale	Baltimore		Johannesburg	
Fear	0.8901		0.7654	
Observation	0.8702		0.8523	
Victimization	0.8484		0.8053	
Adult Male Social Support	0.8837		0.8279	
Adult Female Social Support	0.8990		0.8605	
Depression	0.8410		0.7656	
PTSD	0.9436		0.8151	
	Baltimore Female	Johannesburg Female	Baltimore Male	Johannesburg Male
Fear	0.8972	0.7588	0.8739	0.7694

Observation	0.8754	0.8308	0.8671	0.8582
Victimization	0.8563	0.8024	0.8436	0.7912
Adult Male Social Support	0.8600	0.8097	0.9046	0.8457
Adult Female Social Support	0.8861	0.8759	0.9075	0.8454
Depression	0.8119	0.7196	0.8579	0.7985
PTSD	0.9533	0.8127	0.9493	0.8132

Missing Data

Respondents were dropped from the analysis if the overall quality of their responses was deemed to be low. Three categories were created to define “low quality”: 1) the respondent was missing more than 200 questions on the survey; 2) the respondent fell into two or more of the following categories: a) they answered the Likert scale type questions in sections B or E with the same answer repeatedly; b) they answered between 100 and 199 of the questions with “don’t know” or “refuse to answer”; c) they were flagged by the research team as finishing too quickly or clicking through the survey without looking; or d) they finished the survey in less than 15 minutes; 3) the interview was missing from the database (occurred only in Baltimore). With respect to the last category, we needed to create records for them that contained the city, site, date, respondent ID, and coupon in/out information for the sake of maintaining seed cluster strings (to create weights and to cluster by seed chain), but they contained no other data.

As mentioned above, respondents were excluded from the relevant analyses if they were missing answers to the sex in the last 12 months question or to the condom use question. Missing data for the violence variables were treated as follows. If a respondent was missing less than one third of the items on a scale (for fear and observation this was two items and for victimization this was one item), the missing values were replaced with

the mean value of that item. They were then assigned a binary value based on their overall additive score, as others were. If more than a third of the items on the scale had missing values, the respondent was dropped from analyses that included that variable. Thus, the size of the analytic sample differs among analyses according to the measures of violence included (for example analytic sample sizes ranged from 437 to 442 in Baltimore for the models for sex in the last 12 months and from 487 to 488 in Johannesburg). Figures 3.5 – 3.8 are flow charts that illustrate the specific junctures where respondents were dropped from the analytic sample and the size of the analytic sample for each set of analyses.

For all covariates that were binary measures, missing values were replaced with the mean value of the variable. For the covariates based on underlying scales (adult social support, depression, and PTSD), missing items were treated similarly to the violence scales except for an additional step. If a respondent was missing less than a third of the items on the scale, those items were replaced with the mean of that item in the sample. For those missing more than a third of the items, an overall mean of the binary variable was calculated and used to replace the missing variable. These procedures for handling missing data were adopted in order to include as many respondents as possible in each analysis. Table 3.11 shows the number of respondents who had covariates replaced due to missing values.

Table 3.11: The Number of Respondents whose Missing Items were Replaced with the Mean, by Gender and Site		
Baltimore and Johannesburg Samples, 2013 WAVE Study		
Variable	Sex in the Last 12 Months	Condom Use at Last Sex
<u>Baltimore</u>		

Raised	1 male and 1 female	0 people
Alcohol	7 males and 2 females	1 male and 1 female
Male Toughness	6 males and 1 female	1 male and 1 female
Female Adult Social Support	6 males and 3 females	
Male Adult Social Support	6 males and 4 females	3 males and 2 females
Partner Type		3 males and 3 females
Depression	20 males and 5 females (8 males and 2 females had one item replaced)	10 males and 2 females (5 males and 1 female had one item replaced)
PTSD	18 males and 10 females (12 males and 4 females had items replaced)	10 males and 6 females (8 males and 3 females had items replaced)
<u>Johannesburg</u>		
Raised	1 male	0 people
Alcohol	0 people	0 people
Male Toughness	2 females	1 female
Female Adult Social Support	19 males and 6 females	
Male Adult Social Support	19 males and 6 females	9 males
Partner Type		2 males and 1 female
Depression	1 female (3 males and 2 females had one item replaced)	1 female (3 males and 1 females had one item replaced)
PTSD	0 people	0 people

Sensitivity analyses were conducted for each of the analyses to assess whether the results changed if all missing responses were replaced with the highest category or the lowest category. There were no differences in significance when missing covariates were replaced with either all high or all low values.

The Study Sites

Baltimore Sample

Respondents were eligible in Baltimore if they lived in one of 5 zip codes in East Baltimore. The map in Figure 3.13 shows the target geographic area in the east side of Baltimore: zip codes of 21213, 21205, 21202, 21231, and 21224. These are low-income city neighborhoods with primarily Black residents, characterized by low, attached row houses. Many of these row houses are abandoned, making the population density of this area lower than it was in the 1950s. The median income of a family in these zip codes was \$39,653 between 2008 and 2012 compared to \$53,046 in the US as a whole (American Community Survey). Several of the neighborhoods with the highest rates of both violence and STIs are in the catchment areas of the study in Baltimore. This is particularly true for young people in these neighborhoods who have some of the highest STI rates in the state.¹¹

In Baltimore, 475 respondents were recruited but 19 were dropped for poor data quality as explained above. The final sample size was 456 respondents. In this sample, 57.7% were male and 42.3% were female. The mean age of respondents was 16.1 years for males and 16.5 years for females. In the analyses, respondents were dropped if they were missing relevant data as described in detail above. Characteristics of the Baltimore sample are shown in Chapter 4.

Johannesburg Sample

In Johannesburg, youth were eligible if they lived in the neighborhood of Hillbrow (see map in Figures 3.14a and 3.14b below). Hillbrow started as a “whites-only”

neighborhood during apartheid. However, at the end of Apartheid, the migration of more affluent people out of densely populated areas resulted in Hillbrow becoming one of the poorest neighborhoods in Johannesburg, attracting migrants from other parts of South Africa and the African continent. The neighborhood is located near the city center and is characterized by densely packed, overcrowded, large apartment buildings. Many have become derelict. South African censuses report that 500,000-800,000 people live in this area, however this is likely an underestimate given the number of migrants – both legal and illegal from within and outside of South Africa. Unemployment – especially amongst young people – is very high leading to income instability and a very uneven distribution of wealth.¹² Although there are some open spaces, leisure areas for young people are limited. In the WAVE qualitative data some youth reported heading to some of the older townships outside of the city to relax, spend time with family, or get away from the dirt and crowdedness. HIV prevalence and rates of STIs are high in Hillbrow, with 30-50% of patients at the local primary health care clinics testing positive for HIV.

In Johannesburg, 497 respondents were recruited and one was dropped for poor data quality after applying the criteria described above. The final sample size was thus 496 respondents. In this sample, 54.8% were male and 45.2% were female. The mean age of respondents was 17.2 years for males and 17.3 years for females. In the analyses, respondents were dropped if they were missing relevant data as was described in detail above. Characteristics of the Johannesburg sample are shown in Chapters 6 and in the appendices.

Statistical Methods

For each chapter, relevant descriptive and bivariate associations were examined.

Descriptive statistics were first calculated for each city and sex-specific study population and tests were used to assess differences in these statistics by gender and site. In Chapter 4, I tested for differences by sex in both demographic variables and outcomes in the Baltimore sample using bivariate logistic regressions. Similar models were run in Chapter 5 with mental health outcomes in order to detect differences by sex and demographic variables in depression and PTSD status. In Chapter 6, similar regressions by gender were run including Baltimore and Johannesburg. City was the independent variable in bivariate logistic regressions of demographic variables and outcomes. Significant differences are noted in descriptive tables in each chapter.

A series of multivariate logistic regressions were conducted to address the specific aims of this dissertation. In the first set of regressions, corresponding to Aim 1, I assessed the relationship between violence exposure (fear, observation, and victimization) and sexual behavior (sex in last 12 months and condom use at last sex) in Baltimore, separately for girls and boys. I estimated a series of logistic regressions specified as follows:

$$\text{logit}(Y) = \beta_0 + \beta_1 * \text{violence} + \beta_2 * X + \varepsilon \quad \text{(Equation 1)}$$

In this model:

Y_i is the outcome variable (sexual intercourse in the last year or condom use at last sex),

β_0 is the log odds associated with the constant,

β_1 is the log odds ratio associated with each type of violence,

β_3 is the vector of log odds ratios associated with a vector for all other covariates.

For each outcome, I estimate four sets of models: one model including fear, one including observation, one including victimization, and a final model that adjusts for all three experiences of violence simultaneously. Modeling each variable individually allows me to explore the direct effects of each violence variable on the outcome while modeling all three together allows me to adjust for the other violence experiences, as they overlap. Changes in the odds ratios in the final model would suggest confounding by the other violence experiences while stability in the odds ratios across these models would suggest different, independent constructs of violence. Multi-collinearity was tested with the variance inflation factor (VIF) command in each set of models.

In the second set of regressions corresponding to Aim 2, the model is expanded to include mental health variables in order to assess the potential that mental health confounds the relationships between violence and sexual behaviors. For this aim, I estimated a series of logistic regressions specified as follows:

$$\text{logit}(Y) = \beta_0 + \beta_1 * \text{violence} + \beta_2 * (\text{mental health}) + \beta_3 * X + \varepsilon \quad \text{(Equation 2)}$$

As in the analyses for Aim 1, I estimate four models for each outcome (one including fear, observation, victimization separately and a final one with all three) and use separate models for depression and PTSD. In these models, β_2 represents the odds ratio associated with either depression or PTSD while β_3 represents the vector of odds ratios associated

with each of the covariates. Changes in the odds ratios on the three different violence variables after introducing mental health variables would suggest that mental health confounds the relationships between violence and sexual behaviors. A lack of change in any of the odds ratios would suggest that the relationship between perception of violence and sexual health is not confounded by mental health.

In the last chapter, a set of regressions – for Aim 3 – explores the differences between Baltimore and Johannesburg by testing a similar model from Chapter 5 – that includes both mental health variables in both Baltimore and Johannesburg. For this aim, I estimate a series of logistic regressions specified as follows:

$$\text{logit}(Y) = \beta_0 + \beta_1 * \text{violence} + \beta_2 * (\text{depression}) + \beta_3 * (\text{PTSD}) X + \varepsilon \quad \text{(Equation 3)}$$

I also tested interactions by city. Those models, shown in the appendices were specified as follows:

$$\text{logit}(Y) = \beta_0 + \beta_1 * \text{violence} + \beta_2 * \text{city} + \beta_3 * (\text{violence} * \text{city}) + \beta_4 * (\text{depression}) + \beta_4 * (\text{PTSD}) + \beta_6 * X + \varepsilon \quad \text{(Equation 4)}$$

$$\text{logit}(Y) = \beta_0 + \beta_1 * \text{violence} + \beta_2 * \text{city} + \beta_3 * (\text{depression} * \text{city}) + \beta_4 * (\text{depression}) + \beta_4 * (\text{PTSD}) + \beta_6 * X + \varepsilon \quad \text{(Equation 5)}$$

$$\text{logit}(Y) = \beta_0 + \beta_1 * \text{violence} + \beta_2 * \text{city} + \beta_3 * (\text{PTSD} * \text{city}) + \beta_4 * (\text{depression}) + \beta_4 * (\text{PTSD}) + \beta_6 * X + \varepsilon \quad \text{(Equation 6)}$$

In this dissertation, I do not explore the potential for modification of effects of each form of violence in the presence of other forms of violence exposure. Figures 3.12a and 3.12b show the overlap between the different measures of violence indicating that the majority of respondents in Johannesburg and just under half of the respondents in Baltimore report experiencing more than one type of violence. Interactions were tested between violence variables; however, the confidence intervals on all of them were unstable and results are not discussed here. This instability is likely due to the lack of statistical power to detect such differences.

All analyses were conducted in Stata 13.1 and. The complex survey design of the RDS was accounted for by using the svyset commands. These commands allow the estimation of linear models using weights and calculates standard errors allowing for clustering of observations in the sample (in this case, around seeds).

Figures



Figure 3.1: Examples of Community Maps Developed During the Qualitative Phase



Figure 3.2: Example of a Photovoice Photo. Captioned "In Order to Have a Healthy Community, You Have to Have Neighbors Willing to Do Something About It."



Figure 3.3: Example of a Photvoice Photo. Captioned "People living around this very dirty environment may contact diseases and they can't have good, clean fresh air to breath."

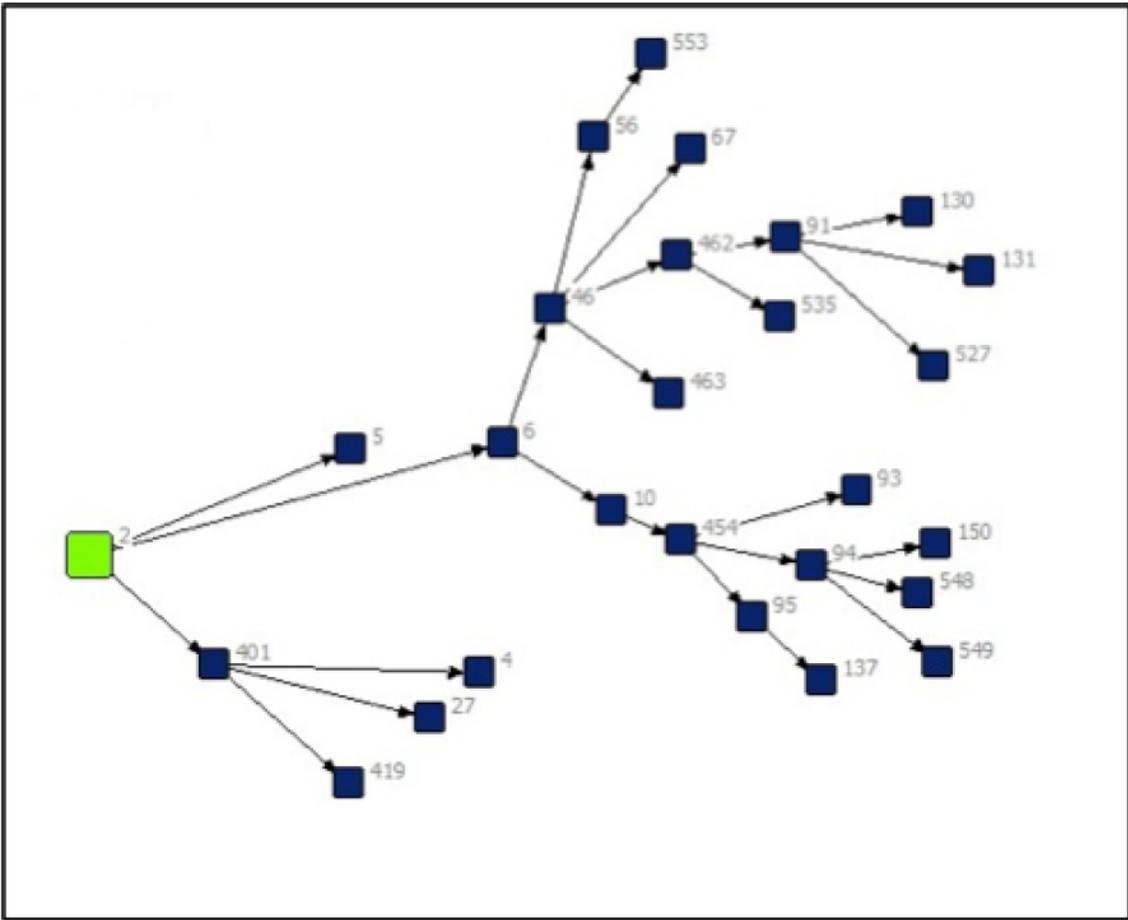


Figure 3.4: Example of an RDS Seed Chain (Numbers are Respondent IDs)

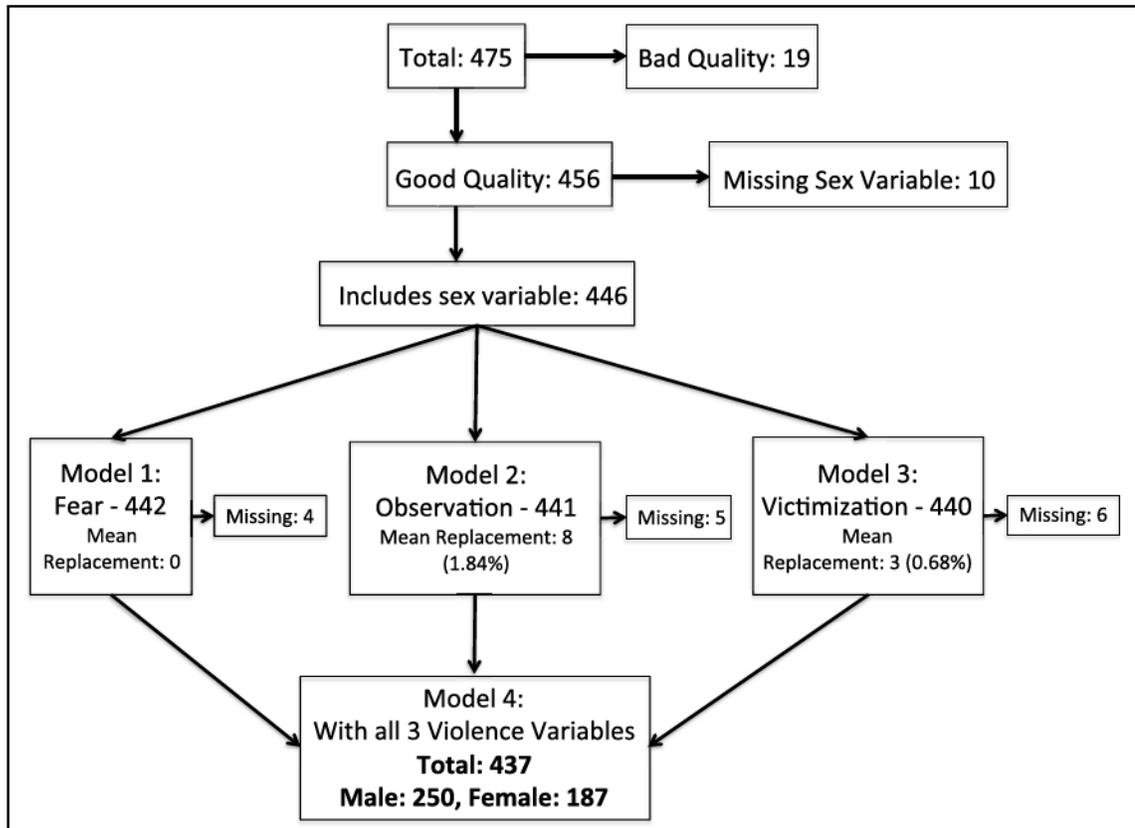


Figure 3.5: Flow Chart of Included Respondents for Sex in the Last 12 Months for all 4 models, in Baltimore

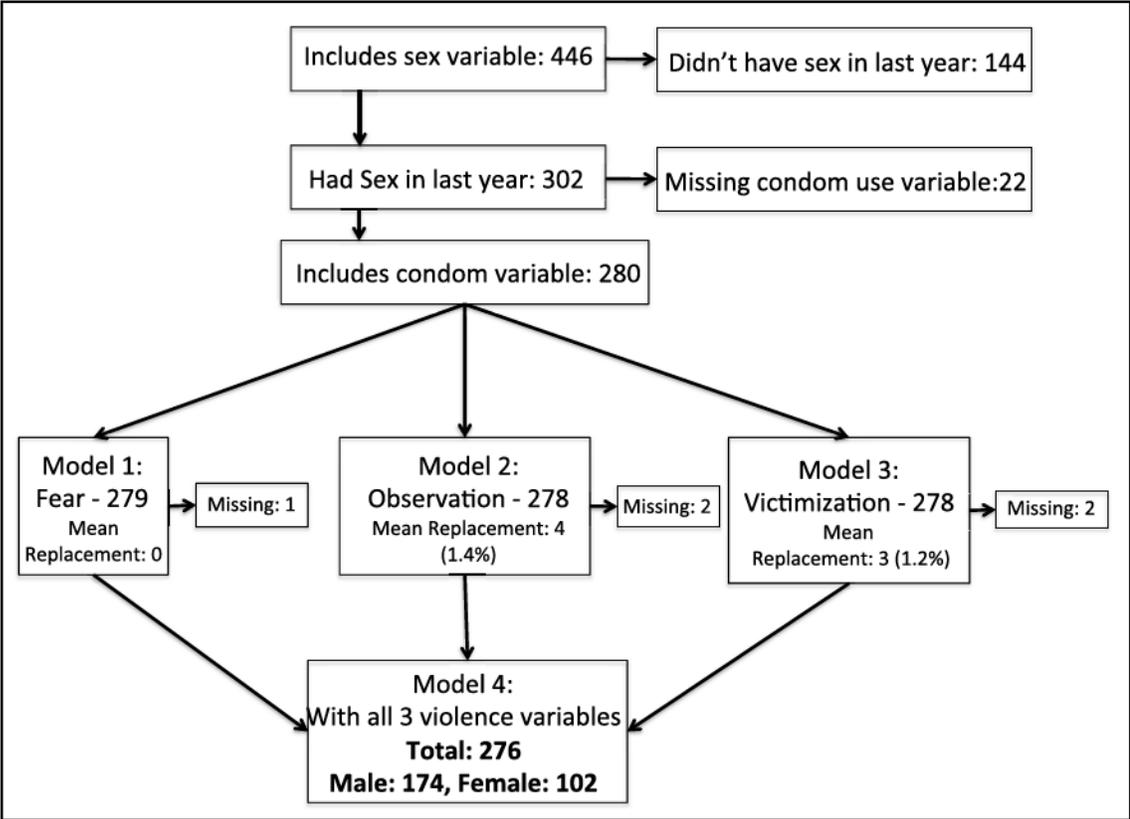


Figure 3.6: Flow Chart of Included Respondents for Condom Use at Last Sex for all 4 models, in Baltimore

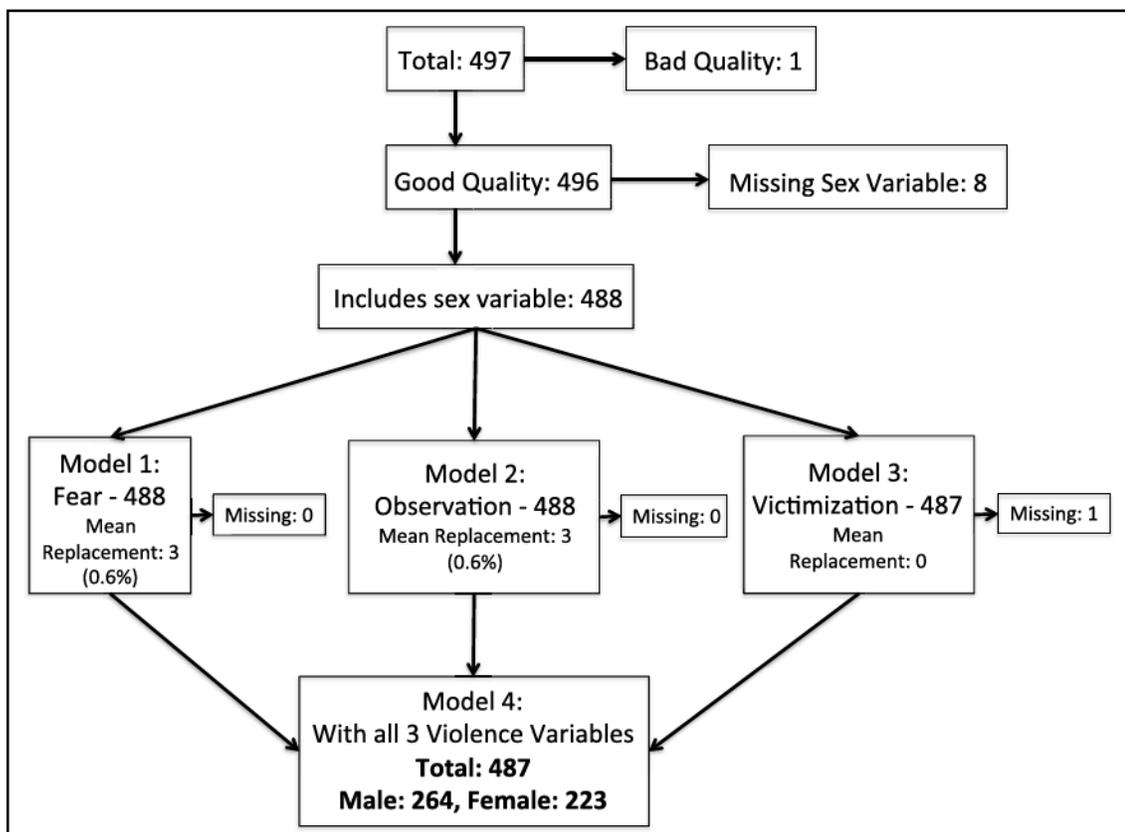


Figure 3.7: Flow Chart of Included Respondents Sex in the Last 12 Months for all 4 models, in Johannesburg

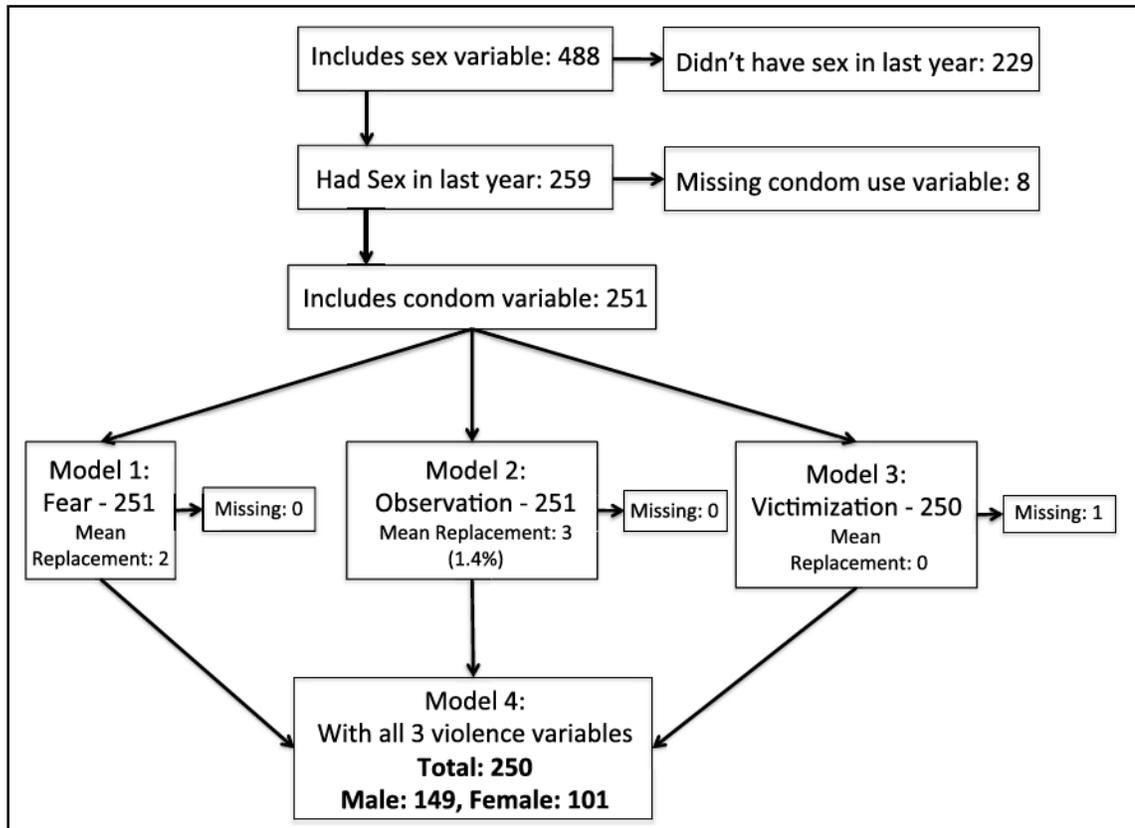


Figure 3.8: Flow Chart of Included Respondents for Condom Use at Last Sex for all 4 models, in Johannesburg

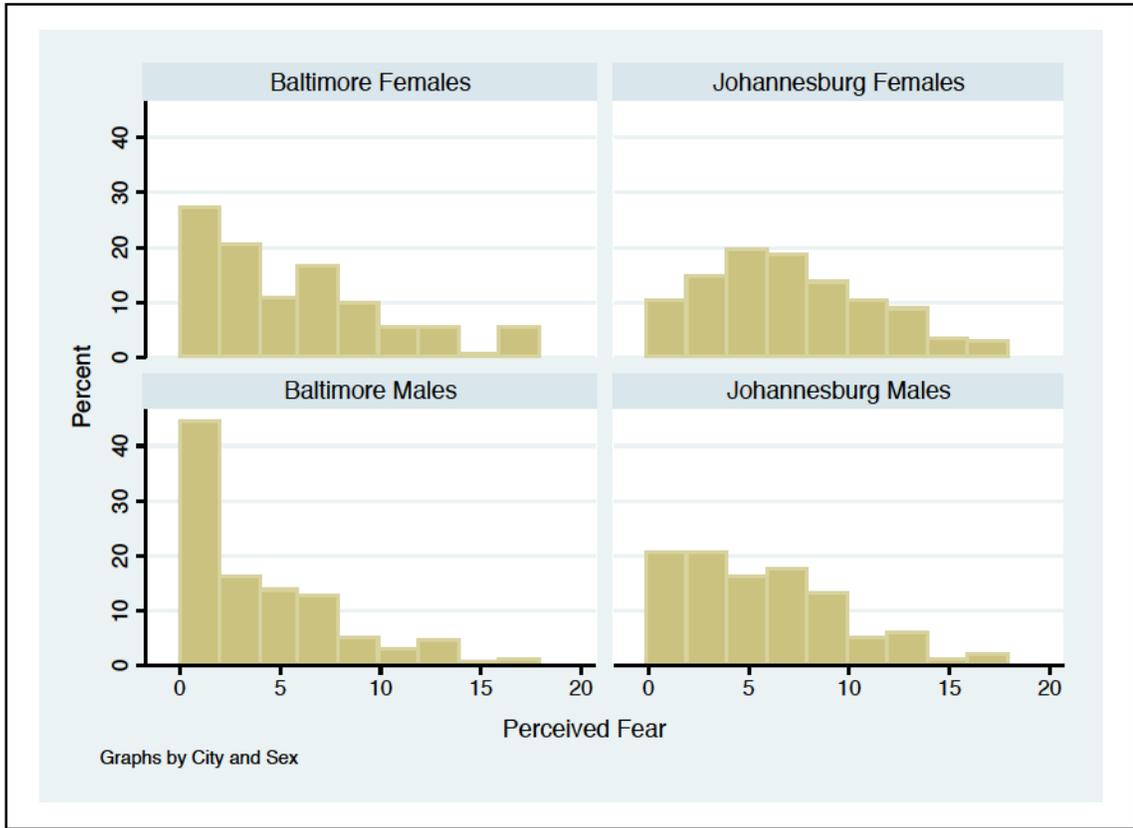


Figure 3.9: Histograms of Fear Scale by Site and Sex

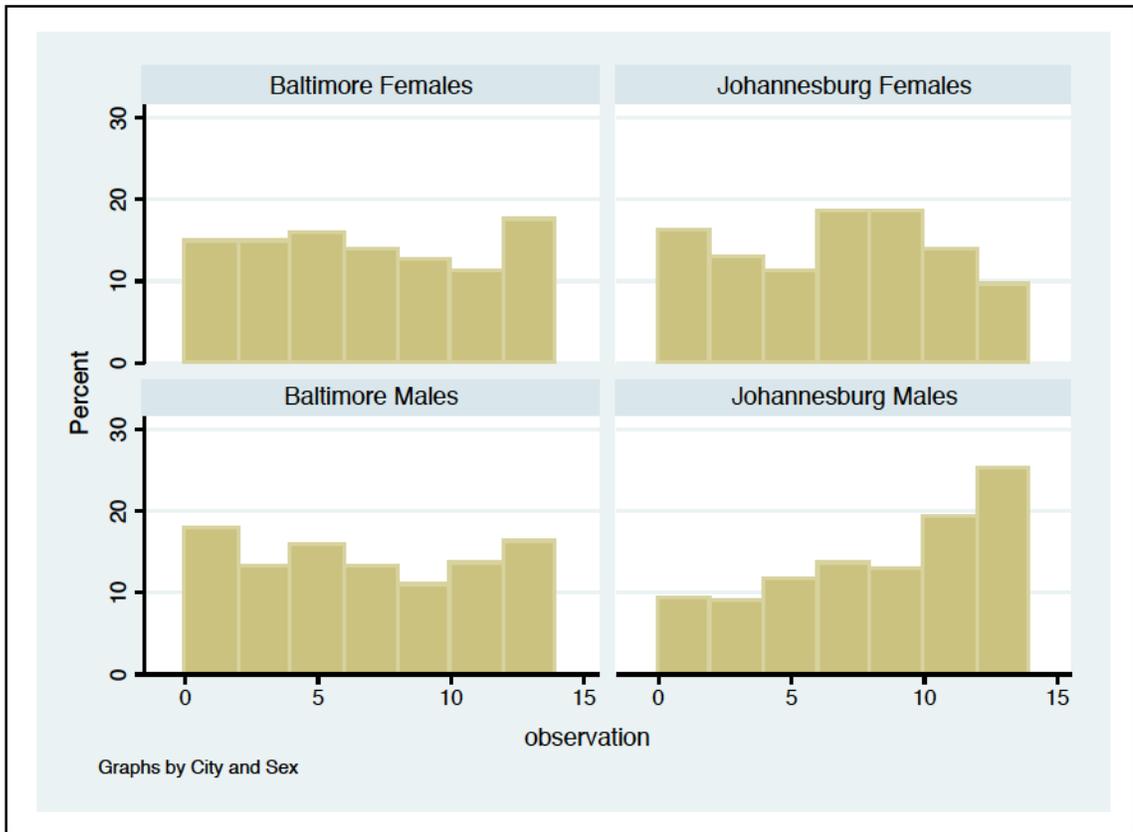


Figure 3.10: Histograms of Observation Scale by Site and Sex

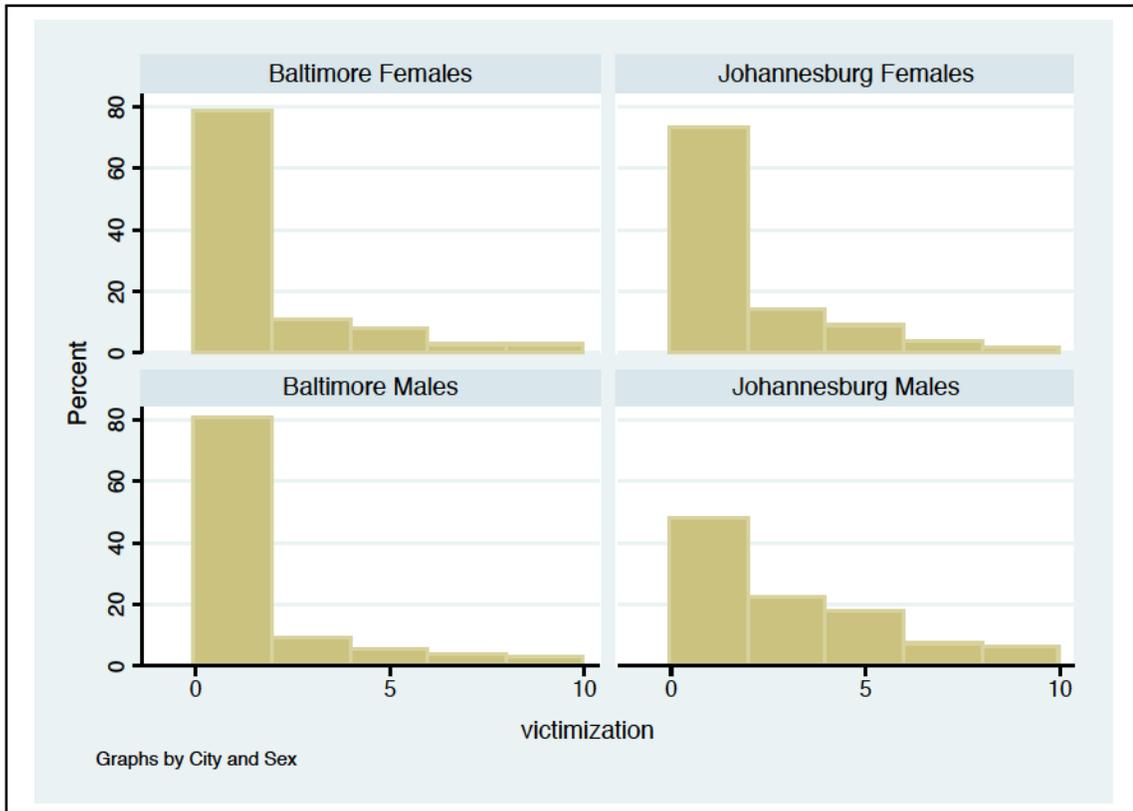


Figure 3.11: Histograms of Victimization Scale by Site and Sex

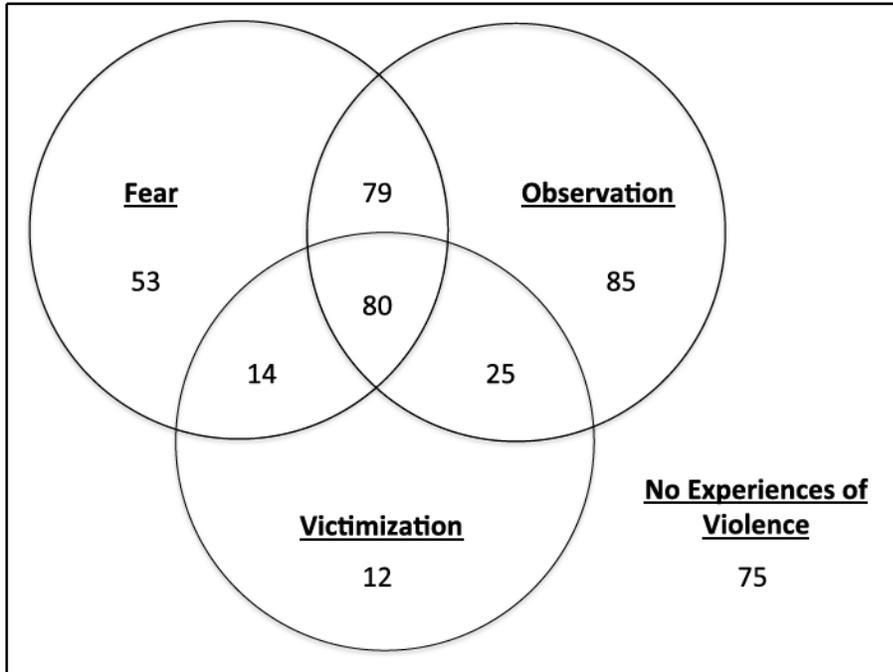


Figure 3.12a: Distribution of 3 Experiences of Violence in Baltimore

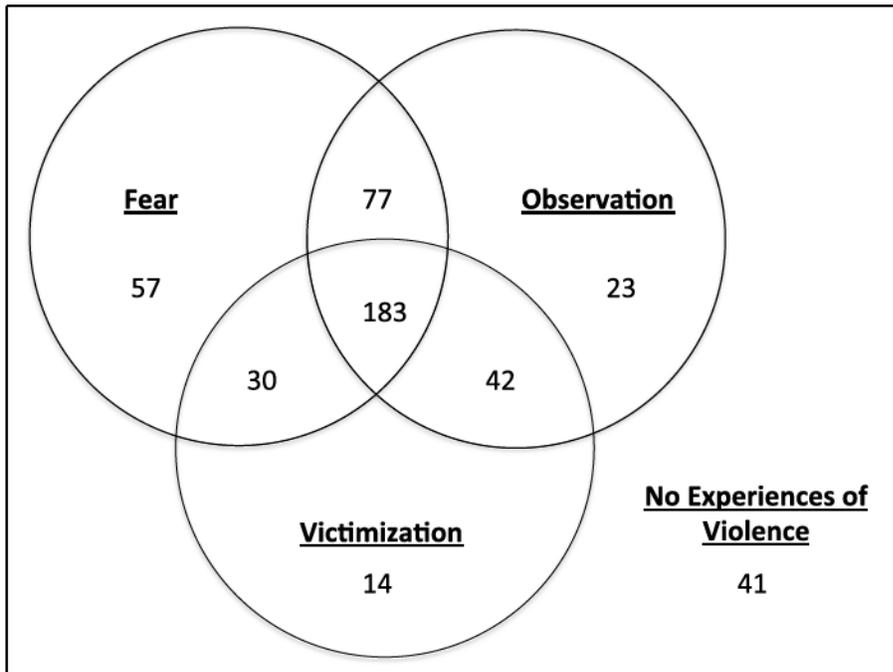


Figure 3.12b: Distribution of 3 Experiences of Violence in Johannesburg

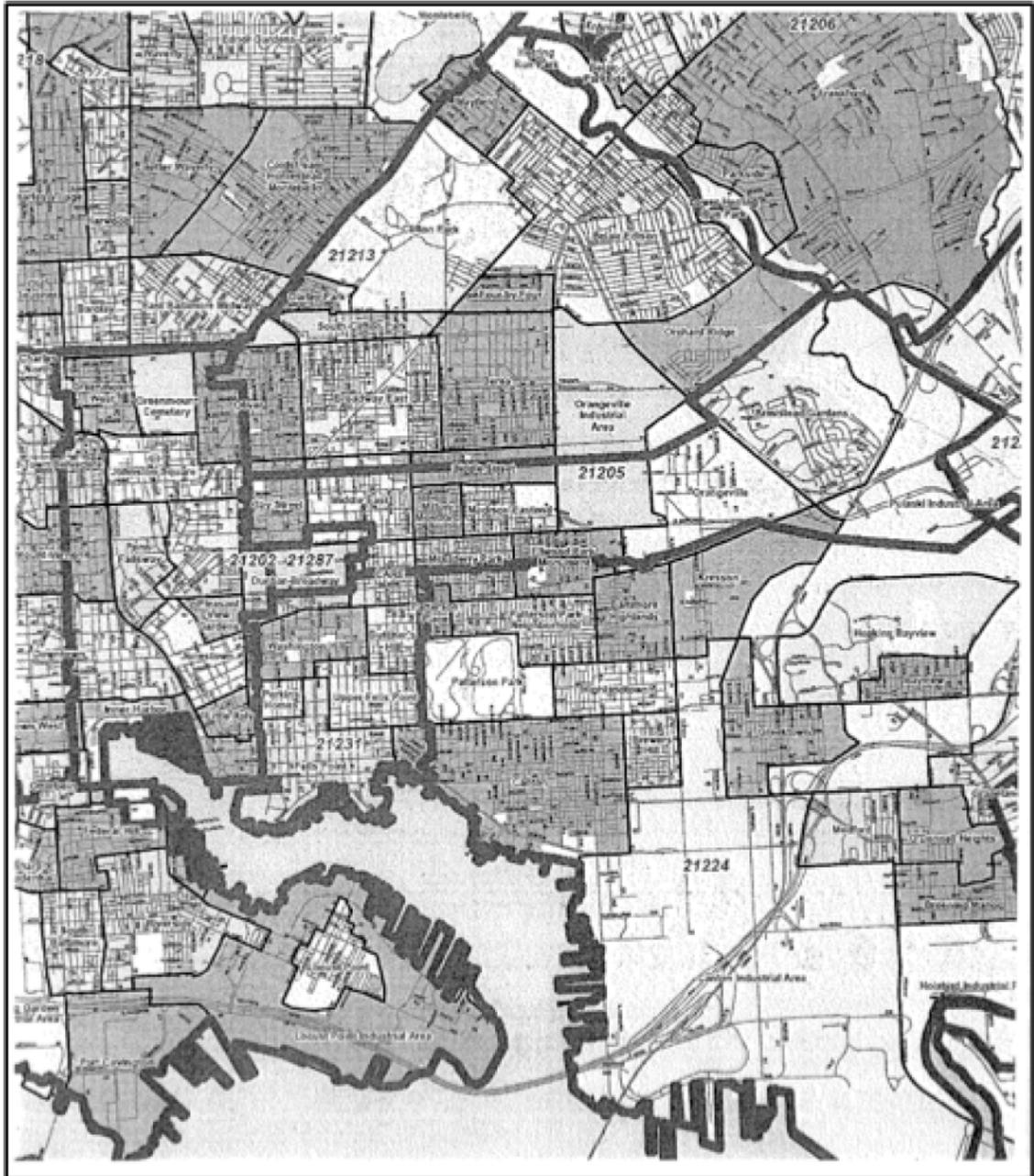


Figure 3.13: Map of the 5 Zip Codes in Baltimore that Determined Eligibility

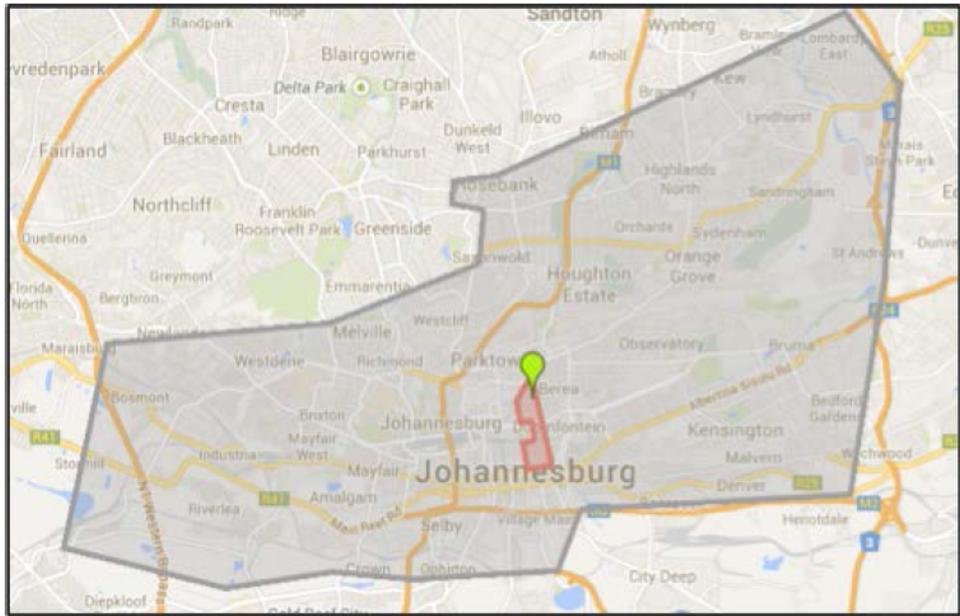


Figure 3.14a: Map of Johannesburg with Hillbrow outlined in Red

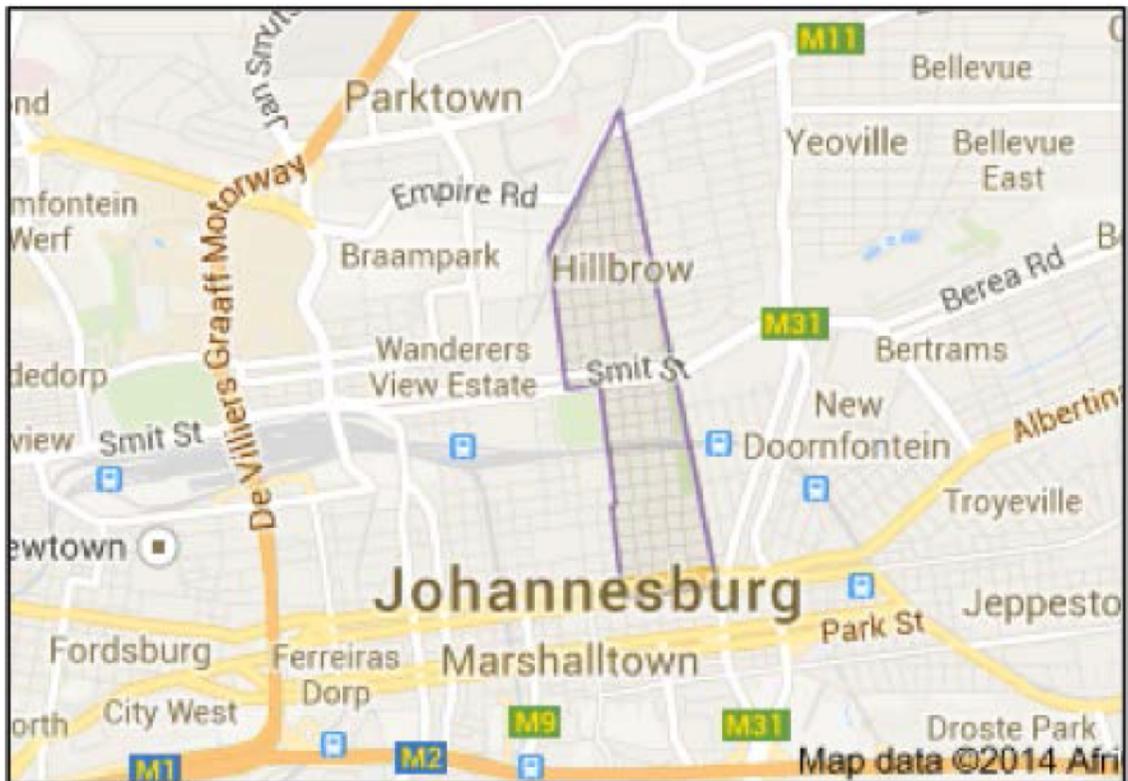


Figure 3.14b: Map of Hillbrow

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**Chapter 4: Are Exposures to Community Violence associated with Sexual Behaviors
among Adolescents in East Baltimore?**

Introduction

This paper explores the relationship between community violence and sexual behaviors among adolescents in a low-income area of Baltimore, MD. Specifically, I investigate the association between three different measures of violent experiences (fear of violence, observation of violence, and victimization) and two sexual behaviors (sex in the last year and condom use at last sex).

Sexual activity is common among adolescents in the United States (U.S.). According to the Youth Risk Behavior Survey (YRBS) conducted by the CDC, in 2013 just under half of all high school students in the U.S. reported ever having had sexual intercourse and approximately one third reported sexual intercourse in the prior three months. While transitioning to being sexually active is normative during adolescence, poor sexual health outcomes are common, making sexual health a major component of health and well-being for adolescents. Of those who had had sex in the last three months, fewer than half (41%) reported condom use at last intercourse.¹ Lack of condom use contributes to the high rates of STI diagnoses for adolescents. Almost a quarter of all adolescents aged 14-19 – and nearly four in ten of those who are sexually experienced – have had one of the five most common STIs (*Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Trichomonas vaginalis*, herpes simplex virus type 2, and human papillomavirus (HPV)).² Also, because over 80% of teen pregnancies are unintended³ and condoms are the most commonly used contraceptive for adolescents,⁴ low levels of condom use contribute to the relatively high number of teenage pregnancies in the U.S.^{1,5}

The prevalence of STIs varies dramatically by social class and race in the U.S. Low-income and racial minority adolescents are more likely to acquire an STI than their

wealthier or white peers.⁶⁻¹¹ Some argue that this is because in the U.S., racial minorities are more likely to be low-income, and income is associated with poor sexual health outcomes.¹² However, racial and ethnic disparities persist even after adjusting for income, personal behaviors, and attitudes.^{11,13} Ellen and Fichtenberg, among others, argue that sexual networks can partly explain racial disparities in STI rates.¹³ Drug use, men who are on the “down-low” about the fact that they have sex with other men,¹⁴ transactional sex, and imbalanced sex ratios – due to high rates of incarceration among males– are a reality in many low-income, minority, urban communities. As a result, individuals at higher risk for STI acquisition are likely to be part of sexual networks in these communities.¹⁵⁻¹⁷

Structural factors also drive the high rates of teenage pregnancy in these low-income neighborhoods. Limited financial resources, reduced educational opportunities, and constrained access to health care reduce many young women’s abilities to learn about and obtain safe and effective contraceptive or abortion services if they prefer not to get pregnant.^{18,19} High rates of unemployment, poor health, and incarceration of young men also influence women’s abilities to plan ahead in multiple aspects of their lives, including contraceptive use and pregnancy. Finally, and relatedly, social norms around the meaning of a pregnancy – and the joy that surrounds one – may inhibit some adolescents from actively or consciously planning not to get pregnant or to end a pregnancy they do not want. These structural factors mold societal norms and can create an ambivalence about pregnancy intentions and contraceptive use, including consistent condom use.²²

Though the experience of community violence is personal, violence is driven by many of the same structural factors described above – high unemployment, drug use,

norms around safety and masculinity^{23,24} – and is a constant reality in many low income, urban neighborhoods. While violence has been declining in the U.S. since the mid 1990s, it remains a common experience among youth living in poor urban communities. In 2012, almost 5,000 young people between the ages of 10 and 24 in the US were killed in homicides (an average of 13 per day). Nearly 600,000 young people were injured in violence-related incidents and treated in emergency departments (an average of 1,642 per day) and just under a quarter of high school students reported that they had been injured in a physical fight in the last year.²⁵

A growing body of research suggests that violence is a major contributor to poor sexual and reproductive health outcomes. Research on the relationship between violence and the sexual health of young people has primarily focused on intimate partner violence (IPV), gender-based violence (GBV) or teen-dating violence (TDV). All three are common among adults in the U.S. and many reported that their first experiences of rape, physical violence, or stalking by an intimate partner, took place between the ages of 11 and 17 years.²⁶ Ten percent of current high school students reported sexual victimization from a partner in the last year.²⁷ Such experiences have been shown to be associated with poor physical and mental health,²⁸⁻³⁰ as well as with poor sexual health outcomes.³¹⁻³⁶ However, less is known about the connection between non-sexual, community violence and sexual health. Steiner et al., using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), showed that previous victimization and/or perpetration of violence was associated with subsequent STI diagnosis, though few other studies have explored the relationship further.³⁷

Literature on experiences of violence suggests that youth in communities where

there are significant amounts of violence are more likely to engage in risky behaviors.⁴¹⁻⁴⁵ This evidence suggests a potential relationship between community violence and risky sexual behaviors. A belief that one will die early might make an STI seem like a minor issue or make an adolescent want to have a child earlier rather than later.

Additionally, though research has been done on the link between violence and a broad range of health outcomes - exercise, obesity, smoking, heart disease, and stress³⁸⁻⁴⁰ – much of this literature focuses on the effect of a single type of violence exposure on health. The measure used often depends on the outcome of interest. Johnson et. al. note that the mental health literature tends to focus on exposure; studies comparing neighborhoods usually focus on concrete counts of crimes; and research on more general health outcomes often focuses on perceptions of safety.⁴⁰ Experiences of community violence, however, can take multiple forms: one can perceive one's community to be particularly violent and be fearful, one can observe violence happening to others, or one can be victimized oneself. These different forms of violence, perceived at the individual level, have been shown to have independent effects on health.

This paper adds to the literature in two important ways. First, by investigating the relationship between violence and sexual behaviors, I extend the work of Steiner et al. to better understand how violence is related to the specific behaviors that put adolescents at risk for an STI and an unplanned pregnancy. Second, by exploring multiple constructs of violence, including fear and observation of violence, I consider experiences of violence that are more prevalent than victimization.

The paper has three objectives: 1) describe and categorize adolescents' experiences of community violence; 2) analyze the associations between experiences of

community violence and sexual activity and condom use; and 3) assess the extent to which the patterns and associations vary between girls and boys.

I hypothesize that violence will have little connection to sexual activity per se, as it is a normative behavior for adolescents in these communities, and taken by itself, provides no information about whether experiences are positive or negative. I also hypothesize a reduction in condom use associated with exposure to violence. I hypothesize that boys will be more likely to engage in sexual activity and but that girls behaviors will be more responsive to violence than boys. Finally, I hypothesize that, because the different experiences of violence intersect, when all three variables are included in a model the independent effects of each measure of violence will be muted.

Methods

The WAVE Study

The data for this research come from the Well-being of Adolescents in Vulnerable Environments (WAVE) Study. The overall goals of the WAVE Study were to understand the health and determinants of health among urban adolescents living in low-income, marginalized neighborhoods. Five sites in five different countries were selected and boys and girls ages 15 to 19 years were included. In this paper, data from one site, Baltimore MD, are used. The John Hopkins Bloomberg School of Public Health IRB approved all survey instruments and research protocols.

Sample and Recruitment

Participants were recruited via Respondent-Driven Sampling (RDS).⁴⁶ Adolescent “seeds” between the ages of 15-19 residing in the target neighborhoods were chosen to serve as the initial contact for recruiting from the target population. The choice of the adolescent seeds was influenced by a formative qualitative research phase and recommendations from local organizations serving adolescents. Following informed consent, adolescent seeds completed a 20-30 minute Audio Computer-Assisted Self-Interview (ACASI) survey on a laptop. Adolescent seeds were then provided with up to three “coupons” with which to recruit eligible friends or acquaintances.⁴⁷ Participants recruited by the initial seeds completed the same survey and were also given three coupons. Adolescents received a primary cash incentive for participation and secondary incentives for up to three recruits.

The analytic sample included 437 respondents. Flow charts (figures 4.1a and 4.1b at the end of the chapter) show sample sizes for the four models estimated for each of the two sexual health outcomes (sex in the last year and condom use at last sex). Respondents were excluded for three reasons: poor interview quality (based on total missing or repeated answers on the survey), missing responses on the outcome variables, or missing answers to more than a third of the items on each individual violence scale.

Measures

Sexual activity in the last 12 months and condom use at last sex were the outcomes in these analyses. *Sexual intercourse* was assessed through a single question asking if the respondent had had sexual intercourse in the previous 12 months. Sexual intercourse was

defined as “when a man's penis is inside a woman's vagina.” Questions about intercourse with same sex partners were not restricted to the last year and therefore are not included here. Ten respondents did not answer this question (6 boys and 4 girls) and were excluded (see Figure 4.1a). *Condom use* was assessed with a single item asking if respondents used a condom the last time they had intercourse. Only those who reported sexual activity in the last year were included in this analysis. Twenty-two respondents who had had sex in the last year did not answer this question (16 boys and 6 girls) were excluded (see Figure 4.1b).

Three measures were used to assess adolescents’ perceptions of community violence: fear of violence, observation of violence, and personal victimization. All three scales were adapted from existing scales in the CDC’s Adolescent Violence Compendium.⁴⁸ Binary (high/low) variables for each of the violence measures were created from the three scales, as the responses were not normally distributed.

Fear was assessed using a scale constructed from six questions about the adolescent’s fear of violence in his or her community during the last 12 months. This scale ranged from 0 to 18, with higher scores indicating more fear; the Cronbach’s alpha – a measure of internal consistency of the scale - was 0.87. The scale was converted into a binary measure in which a score of three points or higher was categorized as “fear of violence” in the last year.

Observation of violence was a scale constructed from seven questions about observing violence in the community. This scale included questions about how often in the previous 12 months the adolescent had experiences such as hearing gun shots, seeing arrests or drug deals or seeing someone hurt with or without a weapon. This scale ranged

from 0 to 18, with higher scores indicating more instances of observed community violence in the last 12 months. The Cronbach's alpha for this scale was 0.87. The scale was converted into a binary measure in which anyone reporting a score of five points or higher was categorized as having observed violence in the last year.

Victimization was assessed based on five 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. The Cronbach's alpha for this scale was 0.85. The scale was converted into a binary measure and a score of one or higher was categorized as having been victimized in the prior year.

In order to retain as many cases as possible, missing items in each scale were dealt with as follows: if fewer than 33% of the items on a scale were missing, then the sample mean of that particular item replaced the missing item. If 33% or more of the items were missing, the respondent was dropped from models using that scale (see flowcharts in Figures 4.1a and 4.b).

The following covariates were included in the models based on previous research suggesting associations of these factors with sexual behaviors as well as their theoretical role as confounders in the relationship between violence and sexual behaviors.^{34,49-57} Covariates included age (15-17 versus 18 and 19 years old), who raised the respondent (two parents vs. other), alcohol use in the last month (yes vs. no), partner type (whether the person was in a relationship with their sexual partner vs. whether that person was a casual or one-time partner), and a single item from a scale assessing masculinity norms (whether or not you strongly agree with the statement "a man should be tough"). Missing values on these covariates were replaced with the sample mean of the variable.

Adult social support was also included and assessed using scales that asked about the presence of a male or female adult (separately) in the respondent's home who "could be turned to with a problem," "will listen when you have something to say," and "expects you to follow the rules." Higher scores on these scales indicated greater male or female adult social support. Binary variables were then constructed with adolescents scoring five or higher on each scale coded as having adult social support. For those missing only one item on this scale, that item was replaced with the mean. For those missing more than one item on this scale, mean of the binary variable replaced the missing item.

Models do not include adjustment for income or socioeconomic status. The WAVE Study focused on poor, urban adolescents living in East Baltimore, so the range of these variables is restricted by design. In addition, young people are often unreliable at reporting income or wealth. In the survey, a perceived relative well-being question was asked (which has been found to be an appropriate measure for adolescent health);^{58,59} however, because there were so few people who felt they were "worse off" than their peers this measure was not considered in these analyses.

Analysis

The first step in the analysis was to describe the prevalence of all covariates and exposures and then to assess differences in prevalence by gender. The second step was to calculate the prevalence of each of the outcome variables and to describe their bivariate relationships with the violence variables as well as the covariates. These tests were all stratified by gender.

The third step in the analysis was to fit a set of four different logistic regression models for each outcome to generate odds ratios and 95% confidence intervals (CIs) evaluating the relationship between violence and sexual behaviors. The first three models include each measure of violence separately. Thus, Model 1 for each outcome includes fear, Model 2 includes observation, and model 3 includes victimization. The final model for each outcome (Model 4) includes all three violence measures together in order to assess the independent effect of each violence measure on sexual activity or condom use. Interaction terms between types of violence were not included in the multivariate models due to insufficient sample size. Note, as the behaviors are relatively frequent, odds ratios do not represent relative risk.

The number of respondents missing responses on any specific covariate ranged from 2 to 10 with an average of 7.4 people in the sexual activity models and from 0 to 6 in the condom use models with an average of 3. Sensitivity analyses were conducted (not shown) to assess whether replacing missing items with the mean changed the substantive conclusions. Missing items were replaced with either the highest value (1) or the lowest value (0) instead of the mean. There were no differences in significance for any of the odds ratios of the key exposures or the covariates.

All of the regression analyses were stratified by gender and adjusted for covariates as described above. Note that type of partner was not included in the models estimating odds ratios for sexual activity because individuals who were not sexually active did not necessarily have an ongoing relationship.

RDS-II weights, which adjust for differential likelihood of selection into the sample, were calculated based on the network size of each individual and all analyses are

weighted. Additionally, the models were estimated allowing for the clustering of respondents within recruitment chains. All models were tested for multicollinearity by assessing the variance inflation factor (VIF) and none was found. All analyses were conducted in Stata 13.1.

Results

Distributions of the perception of violence variables and the covariates are shown in Table 4.1 separately by gender. Boys and girls in the sample reported different levels of fear: 40% for boys versus 70% for girls ($p=0.0001$). Similarly, girls observed violence more often than boys: 59% versus 54% ($p<0.01$). Levels of victimization were similar by sex (25-30% of respondents, $p = 0.0686$). Boys and girls also differed according to the presence of female social support, masculinity norms, and partner types (statistically significant differences are noted in italics).

The prevalence of sexual behaviors and their bivariate associations with violence and each of the covariates are presented in Table 4.2 (sex in the last 12 months) and Table 4.3 (condom use at last sex). Altogether, 65% of boys and 55% of girls reported having had intercourse in the last 12 months. The difference by sex was statistically significant ($p = 0.001$). The proportion of sexually active boys who reported condom use at last sex was 61% versus 50% for girls with no significant sex difference ($p = 0.12$). Girls who had observed violence or been victimized were more likely to have had sexual intercourse in the last year while boys who were fearful were less likely to have had sex in the last year. Boys who had observed violence were more likely to have had sex. Girls who were fearful and boys who had observed violence were less likely to have used a

condom at last sex while girls who observed violence were more likely to have used a condom. Bivariate relationships that were statistically significant are noted in bold text.

The multivariate logistic regression models for sexual activity for girls, shown in Table 4.4a, indicate that all three experiences of violence, when entered in separate models, were significantly associated with higher odds of engaging in sexual intercourse in the last year (Models 1-3). When all three violence measures were included in a single model (Model 4), the odds ratios for all three were slightly attenuated and fear was no longer statistically significant. Thus, for girls, perceptions of violence appear associated with an increase in the likelihood of sexual activity.

The results of the multivariate logistic regressions for sexual activity among boys (shown in Table 4.4b) differed in two ways from the models for girls. First, in the models that assessed each violence measure individually, observation was associated with a higher odds of sexual activity (Model 2), while victimization was not significantly associated (Model 3) and fear was negatively associated with sexual activity (Model 1) – that is, among boys, higher levels of fear were associated with a lower likelihood of sexual activity. Second, the inclusion of all three measures of violence in a single model (Model 4) did not change the ways in which the individual violence measures were associated with sexual activity.

The multivariate results for the models of condom use among girls (shown in Table 4.5a) indicated lower odds of condom use for those who reported fear compared to those who did not (Model 1) and higher condom use among those who observed violence compared to those who did not (Model 2). Victimization was not significantly associated with condom use (Model 3). In Model 4, fear remained associated with reduced odds of

condom use, but neither observation nor victimization was significantly related to condom use. Thus, including fear and victimization attenuated the effects of observation shown in Model 2.

The results for boys in the condom use models differed from the results for girls (shown in Table 4.5b). Observing violence was associated with decreased odds of condom use at last sex (Model 2), but neither fear nor victimization was associated with condom use (Models 1 and 3). In Model 4, observing violence remained associated with lower odds of condom use. Thus, for boys, observation of violence was a better predictor of condom use. This relationship was not attenuated when fear and victimization were also included in the model.

Discussion

My findings linking violence to risky behaviors and negative sexual health outcomes are consistent with Johnson's and Steiner's results about associations between community violence and poor sexual health outcomes.^{40,60} They are also consistent with the literature linking IPV and GBV to risky behavior.³¹⁻³⁶ Specifically, the findings that fear for girls and observation for boys are associated with lower odds of condom use suggest a link between violence and sexual behavior that puts young people at risk for STIs and unintended pregnancies. However, the results also suggest a nuanced relationship between violence and sexual health that cannot be summarized by a blanket statement that violence is always associated with an increase in risky behaviors.

Four important themes emerged. First, transitioning into sexual activity is a normative behavior during adolescence.⁵⁹ Thus, based on the hypothesis that violence

would be associated with increased risky behavior, I expected that we would not see associations between violence and sexual activity, as it is not in and of itself risky. However, this was not what we saw. Observation of violence was associated with increased odds of sexual activity for both boys and girls. For girls, this was also true for victimization. Fear operated differently by gender, with girls who experienced fear being more likely to engage in sexual activity and boys being less likely; however, for girls these results were attenuated and non-significant in the final model (model 4).

The fact that we see this unequivocally negative experience (violence) associated with sexual activity suggests that sexual activity may capture a spectrum of experiences ranging from positive to negative among adolescents living in urban poor environments. Even if protected and consensual, young people can learn, grow, and be supported from healthy sexual engagement or they can find it to be scary, painful, and emotionally complicated. Such negative experiences are not discernable in our measure of sexual activity and there are no measures of positive sexual experiences in the WAVE Study.

Further information is needed about the context of sexual activity among urban poor adolescents. The positive and negative aspects of adolescent sexual activity may be clarified by an understanding of the partnership context in which they occur. Poverty as a structural factor weakens relationships in urban poor settings in the US⁶⁰⁻⁶² and violence may be associated with weaker partnerships among adolescents. In the absence of information related to the nature of partnerships, the association between violence and sexual activity is difficult to interpret.

Additionally, normative behaviors differ by chronological and developmental age. While sexual activity is a normative transition during adolescence, the timing of the event

is dependent not only on chronological age, but also on developmental age. In middle to late adolescence, whether sexual activity is positive or negative may reflect the developmental age of young people rather than their age in years. Introducing a developmental perspective as well as indicators of positive and negative experiences, into the study of sexual health activity would allow for a more comprehensive understanding of the relationship between violence exposure and sexual health in poor urban settings.

The second theme that emerged in my findings was that fear operated in a distinctly different way than observation or victimization. Observation and victimization are, ostensibly, countable experiences. Fear, on the other hand, is a cognitive and emotional response to stimuli (actual and perceived).⁶³ It is generated by observation of violence and victimization, but is also influenced by a collective narrative around violence that permeates most young people's lives in these neighborhoods.⁶³ People are fearful due to both their own experiences and what their communities believe is worth being scared of.

Understanding the difference in the collective narrative of fear by gender may illuminate the sex differences I observed. Victimization, harassment, and the fear of both are common experiences for young women living in low income, urban settings.⁶⁴ In order to prevent victimization, young women's lives take place more at home, on the stoop, in schools, and in families' or friends' homes, while young men's lives take place on the streets, corners, and basketball courts of the neighborhood.⁶⁴ In this way, women's fear is both anticipatory and protective; while for boys, fear may be based on personal experiences of violence that make their own vulnerability more real to them and is, in that way, reactive.⁶⁵ These personal experiences of violence, in conjunction with the fact that

there is less control over their lives and movement, may result in a young man who experiences fear withdrawing from the more “normal” developmental behavior of engaging in sexual activity.

The third theme from my findings relates to the inconsistency in the associations between perceptions of community violence and condom use. A lack of condom use was hypothesized a priori to be risky and thus, that violence would be negatively associated with condom use. For girls, fear was associated with lower odds of condom use while observation of violence was associated with higher odds (although insignificant after adjusting for the other violence experiences). For boys, observation was associated with lower odds of condom use while other violence experiences were unrelated.

There are multiple reasons why young people do not use condoms and the results suggest that gender norms likely impact the associations between violence and condom use. Girls are much more likely to report fear. If this is measurement error, it may potentially bias the results, especially for boys. Or if girls are really that much more fearful, it may be the driver of behaviors more than for boys. Fear may also be correlated so that women who experience neighborhood fear may also experience fear in a relationship. In relationships where there are uneven power dynamics, girls may have less agency to negotiate condom use. Alternatively, and in the opposite direction, girls who are fearful in their neighborhoods may partner with someone who makes them feel safer and ultimately choose to signal their attachment to that person by discontinuing condoms, a marker of trust in the partnership.^{62,66} Knowing more about the types of partnerships is important to better understand these findings. For girls, fear may also directly affect self-efficacy— a phenomenon we see in other fear situations like childbirth⁶⁷ and adherence to

drug regimens⁶⁸ – so that those who are fearful are less able to match their intentions and behaviors.

While observation of violence was correlated with increased use of condoms for girls (although the relationship was not significant in model 4), observation was correlated with reduced use for boys. Young men who observe violence may have a stronger sense of their vulnerability, be overly fatalistic, and have lessened interest in preventing future risk.⁶⁹ Understanding more about how young men view relationships – even nascent ones – will help us understand whether violence is related to those views or to other risky behaviors.

The final theme in my findings is related to the complementarity of the constructs of violence, which had independent effects on sexual behaviors, as shown by the stability of odds ratios in the models including all three measures of violence experiences compared to models including one measure. This finding suggests that if violence is found to be associated with more negative experiences of sexual activity, interventions need to not only address the individual needs of victims of violence, but also address witnesses and the collective narratives around violence. In terms of the fear experiences, creating structures to support young men in dealing with strong masculine narratives of safety and victimization are also essential.

My results call for a more in depth understanding of how young people perceive and understand violence and the relational context in which they engage in sexual activity. Research has shown a correlation between partnerships and consistent contraceptive use. Thus a next step will be to explore whether violence is associated with less healthy or satisfying partnerships or less ability to change unsatisfying partnerships.

Further investigation of other measures of sexual well-being – such as sexual satisfaction or coercion – would better characterize the positive and negative experiences related to sexual activity.

Beyond understanding more about adolescents' sexual partnerships, there are a few other clear next steps for this research agenda. The cross sectional nature of this study does not allow for an investigation of the temporal sequence of violence and sexual behaviors and understanding the timing of these events is essential. We were also unable to distinguish the effect of chronic versus acute experiences of violence. Finally, more specific attributes of the violence experiences – especially the identity of the victim or of the perpetrator– may help us better understand the nuances of violence and when it is associated with particularly negative health outcomes. To complement these quantitative analyses, a qualitative exploration of the processes linking violence to behaviors would shed light on the ways young people themselves understand these experiences.^{8,70}

The lack of significant association between the other violence exposures – particularly victimization – may be partially explained by lack of statistical power due to small sample size. For example, with the sample sizes presented here, there would have to be a 10-percentage point difference in condom use amongst those who had observed violence compared to those who have not in order to detect a difference with 80% power and an alpha of 5%.

Conclusion

Experiencing violence at the community level is common for adolescents in East Baltimore. Yet these exposures are diverse and varied and extend beyond only those of

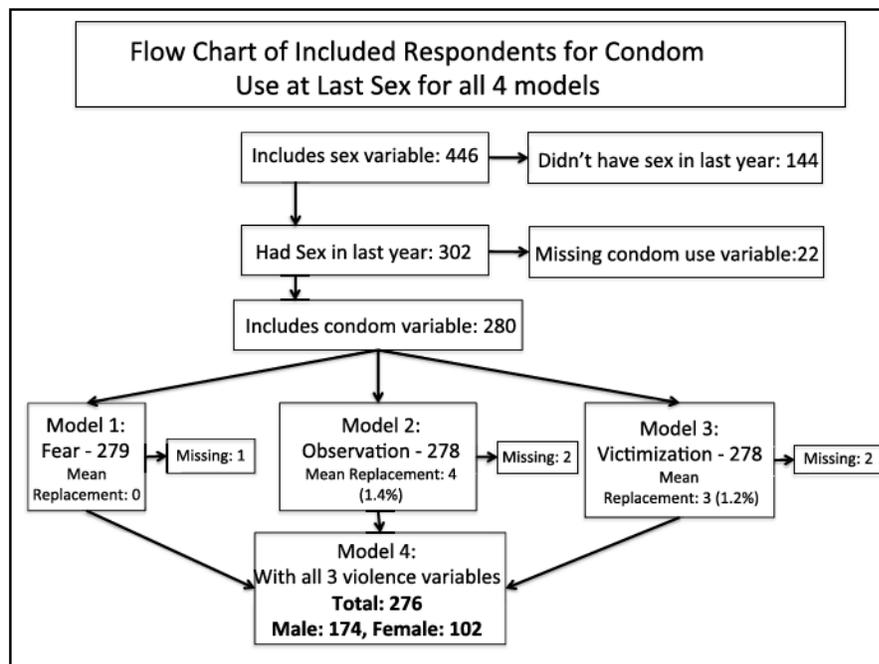
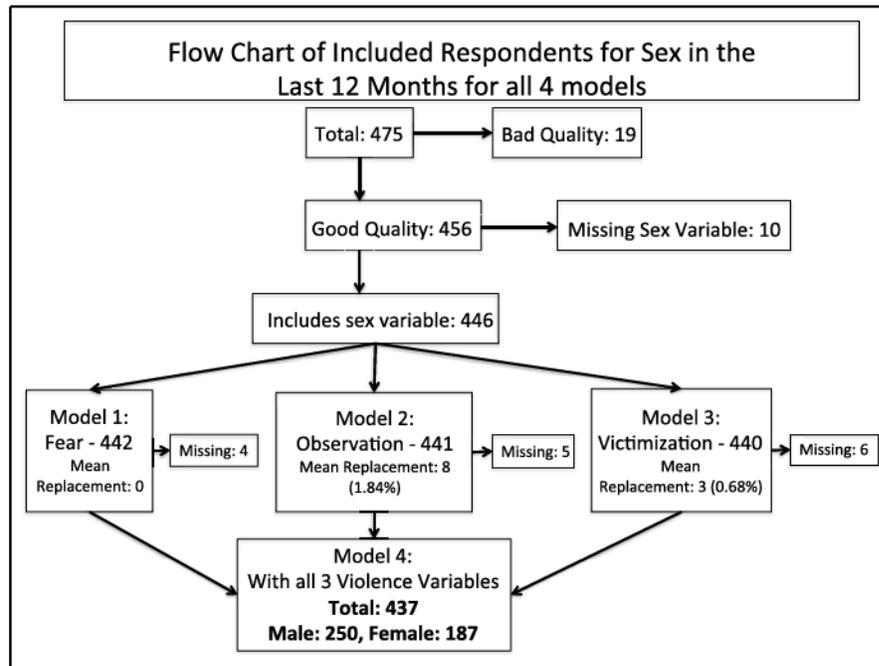
victimization. Girls in particular report high levels of fear. By linking sexual health and community violence, this paper demonstrates that different forms of violence exposures threaten the health of poor, urban adolescents and that for both young men and young women, fear is an important component of violence exposures. Understanding more about how the high rates of violence affect young people outside of being victimized themselves is an urgent need. Public health and medical programs that focus solely on victimization and do not address those who have observed or are fearful of violence may miss an opportunity to reach a struggling young person and have a larger impact. Researchers must also prioritize exploring the differences in experiences of fear for young men and women.

In the longer term, researchers must prioritize further examination of the mechanisms through which violence might be associated with riskier behaviors. Specifically, there is a need to explore the potential that violence impacts the types of partnerships that young people engage in – they can be a healthy coping mechanism to extreme violence or they can happen with less intention, agency, or satisfaction. Cognitive behavioral approaches that help adolescents to be aware of their choices and emotional responses have been shown to have effects in helping adolescents change behavior in other areas of responses to violence⁷¹ and may also support young people in their sexual partnerships.

These results have implications for both the study of violence and the study of adolescent sexual behavior. The results about partnerships emerge from the work with violence, but they do not depend on analyzing violence – i.e. they are not specific to the relationship between violence and sexual behaviors. The opposite is also true; the points

about violence are not dependent on sex – for example the fact that fear works differently has implications for all studies of violence outside of its relationship to sexual activity. Future work not analyzing this explicit relationship must take into consideration the patterns observed here.

Figures



Figures 4.1a and 4.1b: Flow Charts that Describe Analytic Samples for Models of Sex in the Last 12 Months in Baltimore (Above) and Condom Use at Last Sex in Baltimore (Below)

Table 4.1: Prevalence of All Covariates and Violence Variables, by Gender		
Percentages are weighted; unweighted Ns shown in parentheses. Weighted mean (weighted standard error shown in parentheses)		
Baltimore Sample, 2013 WAVE Study		
	Girls N=189	Boys N=257
Age Group		
15-16	49.0 (88)	59.4 (155)
17-19	51.0 (101)	40.6 (102)
Mean Age (SE)	16.4 (0.07)	16.1 (0.35)
Raised		
Two Parents	39.9 (64)	36.5 (84)
Other	60.1 (125)	63.5 (173)
Female Adult Social Support Scale		
Low	<i>18.6 (24)</i>	<i>10.1 (33)</i>
High	<i>81.4 (165)</i>	<i>89.9 (220)</i>
Male Adult Social Support Scale		
Low	37.9 (72)	28.9 (73)
High	62.1 (117)	71.1 (184)
Alcohol in the Last Month		
Yes	27.1 (52)	22.2 (62)
No	72.9 (137)	77.8 (195)
A Man Should be Tough		
Agree	30.4 (62)	50.7 (145)
Disagree	69.6 (127)	49.3 (112)
Partner Type	N=108	N=177
Relationship	86.2 (91)	65.0 (121)
Other	13.8 (12)	35.0 (56)
<u>Experiences of Violence</u>		
Fear		
Yes	<i>70.2 (68/189)</i>	<i>40.6 (114/253)</i>
No	<i>19.8 (68/189)</i>	<i>59.4 (114/253)</i>
Observation		
Yes	<i>59.1 (124/187)</i>	<i>54.0 (157/254)</i>
No	<i>59.1 (63/187)</i>	<i>46.0 (97/254)</i>
Victimization		
Yes	30.2 (61/189)	25.6 (77/251)
No	69.8 (128/189)	74.4 (174/251)

Italics indicate significant chi square tests across sex at the 5% level

Table 4.2: Prevalence of Sex in Last 12 Months and Cross-tabulation of Sex in the Last 12 Months by all Covariates, by gender Baltimore Sample, 2013 WAVE Study		
Variable	Girls	Boys
Total	54.7 (109/189)	63.1 (193/257)
Age Group		
15-16	46.5 (38/88)	57.3 (109/155)
17-19	62.5 (71/101)	69.9 (84/102)
Raised		
2 Parents	60.6 (34/64)	62.8 (59/84)
Other	50.7 (75/125)	63.3 (134/173)
Female Adult Social Support Scale		
Low	64.2 (15/24)	69.0 (25/33)
High	52.5 (94/165)	62.1 (168/224)
Male Adult Social Support Scale		
Low	42.5 (39/72)	55.5 (58/73)
High	62.1 (70/117)	66.9 (135/184)
Alcohol Last Month		
No	48.9 (66/135)	59.7 (140/188)
Yes	69.6 (43/54)	72.5 (53/69)
Tough Man		
Disagree	52.5 (70/126)	59.7 (78/106)
Agree	59.4 (39/63)	67.9 (115/151)
Fear		
No	52.0 (39/68)	69.4 (110/139)
Yes	55.8 (70/121)	58.1 (83/118)
Observation		
No	39.0 (27/63)	49.9 (63/97)
Yes	65.4 (82/126)	72.8 (130/160)
Victimization		
No	48.0 (71/128)	57.7 (127/174)
Yes	70.3 (38/61)	75.8 (66/83)

Bolded cells indicate statistically significant differences in sex in the last year between the two categories at the 5% level.

Table 4.3: Prevalence of Condom Use at Last Sex and Cross-tabulation of Condom Use at Last Sex by all Covariates, by gender Baltimore Sample, 2013 WAVE Study		
Variable	Girls	Boys
Total	49.9 (50/103)	60.7 (102/177)
Age Group		
15-16	49.8 (19/35)	63.7 (65/97)
17-19	50 (31/68)	57.5 (37/80)
Raised		
2 Parents	48.3 (16/32)	45.7 (32/57)
Other	51.2 (34/71)	68.1 (70/120)
Girls Adult Social Support Scale		
Low	31.5 (6/13)	46.0 (10/23)
High	54.7 (44/90)	62.7 (92/154)
Male Adult Social Support Scale		
Low	32.3 (13/37)	43.1 (25/52)
High	57.1 (37/66)	68.5 (77/125)
Alcohol Last Month		
No	54.7 (36/64)	60.7 (79/131)
Yes	40.3 (14/39)	60.7 (23/46)
Tough Men		
Disagree	48.3 (34/67)	62.5 (44/72)
Agree	53.2 (16/36)	59.0 (58/105)
Partner Type		
Relationship	54.0 (42/88)	72.1 (75/118)
Non-relationship	29.7 (6/15)	41.2 (27/59)
Fear		
No	70.8 (21/39)	60.9 (58/101)
Yes	40.9 (29/64)	60.4 (44/76)
Observation		
No	42.4 (11/25)	76.4 (36/57)
Yes	52.9 (39/78)	51.9 (66/120)
Victimization		
No	50.8 (33/69)	68.9 (73/118)
Yes	48.3 (17/34)	44.5 (29/59)

Bolded cells indicate statistically significant differences of condom use across each category at the 5% level.

Table 4.4a: Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Girls)
Baltimore Sample, 2013 WAVE Study

VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.4** (1.2 - 1.8)			1.1 (0.8 - 1.5)
Observation		3.6*** (3.3 - 3.9)		3.1*** (2.7 - 3.6)
Victimization			3.1*** (2.4 - 4.0)	2.6*** (1.9 - 3.5)
Raised by (ref: 2 parents)	0.7* (0.5 - 0.9)	0.6* (0.4 - 0.9)	0.5** (0.4 - 0.8)	0.5** (0.3 - 0.8)
Adult Female Social Support	0.6 (0.3 - 1.0)	0.6* (0.3 - 1.0)	0.6* (0.4 - 0.9)	0.7* (0.5 - 1.0)
Adult Male Social Support	2.5*** (1.9 - 3.4)	2.9*** (2.0 - 4.1)	2.6*** (2.1 - 3.1)	3.0*** (2.2 - 4.2)
Age (ref: <17)	1.9* (1.1 - 3.4)	1.8** (1.3 - 2.7)	2.0* (1.2 - 3.3)	2.0** (1.4 - 2.8)
Drank alcohol last month	2.1*** (1.7 - 2.6)	2.0*** (1.6 - 2.5)	2.1*** (1.6 - 2.6)	2.0*** (1.7 - 2.5)
Believe men should be tough	1.6 (0.8 - 2.9)	1.5 (0.9 - 2.4)	1.5 (0.8 - 2.6)	1.4 (0.8 - 2.3)
Constant	0.6* (0.3 - 1.0)	0.4** (0.2 - 0.6)	0.6* (0.4 - 0.8)	0.2*** (0.1 - 0.4)
Observations	189	187	189	187

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

**Table 4.4b: Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Boys)
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4** (0.3 - 0.6)			0.4** (0.2 - 0.6)
Observation		2.5*** (2.0 - 3.0)		2.7** (1.7 - 4.3)
Victimization			1.9 (0.7 - 4.8)	1.6 (0.5 - 5.1)
Raised by (ref: 2 parents)	1.5 (0.8 - 2.8)	1.8* (1.0 - 3.2)	1.7 (0.9 - 3.4)	1.6 (0.9 - 2.8)
Adult Female Social Support	0.8 (0.1 - 5.2)	0.7 (0.1 - 4.8)	1.0 (0.1 - 7.8)	0.9 (0.1 - 6.5)
Adult Male Social Support	0.9 (0.3 - 2.4)	1.4 (0.4 - 4.4)	1.3 (0.4 - 4.0)	1.1 (0.5 - 2.9)
Age (ref: <17)	1.8** (1.3 - 2.6)	1.8* (1.1 - 2.8)	2.0** (1.4 - 2.8)	1.9* (1.0 - 3.6)
Drank alcohol last month	1.3 (0.9 - 1.9)	1.0 (0.6 - 1.6)	1.3 (0.9 - 1.8)	0.9 (0.5 - 1.4)
Believe men should be tough	1.1 (0.6 - 2.2)	1.2 (0.6 - 2.3)	1.3 (0.7 - 2.5)	1.1 (0.6 - 2.0)
Constant	2.8 (0.3 - 31.1)	0.9 (0.0 - 17.0)	0.8 (0.0 - 16.4)	1.3 (0.1 - 16.6)
Observations	253	254	251	250

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

**Table 4.5a: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Girls)
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Condom at last sex aOR	(2) Condom at last sex aOR	(3) Condom at last sex aOR	(4) Condom at last sex aOR
Fear	0.3* (0.1 - 0.7)			0.3** (0.1 - 0.6)
Observation		1.4* (1.1 - 1.9)		1.3 (1.0 - 1.9)
Victimization			1.1 (0.7 - 2.0)	1.7 (0.9 - 3.0)
Raised by (ref: 2 parents)	1.8** (1.2 - 2.6)	1.9** (1.4 - 2.7)	2.1*** (1.6 - 2.8)	1.6* (1.1 - 2.2)
Adult Male Social Support	3.6*** (2.4 - 5.3)	4.0*** (2.7 - 5.8)	4.2*** (3.0 - 5.9)	3.7*** (2.5 - 5.4)
Age (ref: <17)	1.0 (0.6 - 1.6)	0.8 (0.5 - 1.1)	0.8+ (0.6 - 1.0)	1.0 (0.6 - 1.7)
Drank alcohol last month	0.7 (0.4 - 1.3)	0.7 (0.4 - 1.2)	0.7 (0.3 - 1.3)	0.7 (0.4 - 1.2)
Believe men should be tough	0.8 (0.4 - 1.6)	0.9 (0.5 - 1.7)	1.0 (0.6 - 1.9)	0.7 (0.4 - 1.3)
Partner Type (ref: relationship)	0.4** (0.3 - 0.6)	0.4** (0.3 - 0.6)	0.4*** (0.3 - 0.5)	0.4** (0.3 - 0.6)
Constant	0.9 (0.7 - 1.2)	0.3* (0.1 - 0.7)	0.3*** (0.2 - 0.5)	0.7 (0.5 - 1.0)
Observations	103	102	103	102

Highlights in Blue indicate statistically significant ORS>1 and highlights in Yellow indicate statistically significant ORS<1

95% CI in parentheses

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

**Table 4.5b: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Boys)
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Condom at last sex aOR	(2) Condom at last sex aOR	(3) Condom at last sex aOR	(4) Condom at last sex aOR
Fear	1.1 (0.6 - 2.0)			1.2 (0.5 - 2.9)
Observation		0.4* (0.3 - 0.8)		0.5* (0.3 - 0.9)
Victimization			0.4 (0.1 - 1.2)	0.5 (0.1 - 1.8)
Raised by (ref: 2 parents)	3.7*** (2.2 - 6.3)	2.6* (1.2 - 5.9)	2.9* (1.1 - 7.3)	2.9* (1.2 - 6.6)
Adult Male Social Support	3.3*** (2.4 - 4.6)	2.4* (1.2 - 4.5)	2.3** (1.4 - 3.8)	2.4** (1.3 - 4.2)
Age (ref: <17)	0.4** (0.2 - 0.7)	0.4** (0.2 - 0.7)	0.4*** (0.3 - 0.5)	0.4*** (0.2 - 0.6)
Drank alcohol last month	0.9 (0.4 - 1.9)	1.0 (0.4 - 2.1)	0.9 (0.4 - 1.9)	0.9 (0.4 - 2.0)
Believe men should be tough	0.8 (0.6 - 1.1)	0.9 (0.6 - 1.3)	0.8 (0.5 - 1.1)	0.9 (0.5 - 1.4)
Partner Type (ref: relationship)	0.3* (0.1 - 0.8)	0.3* (0.1 - 0.9)	0.3* (0.1 - 0.8)	0.3* (0.1 - 0.8)
Constant	0.8 (0.2 - 3.5)	2.2 (0.2 - 19.3)	1.8 (0.3 - 9.1)	2.2 (0.3 - 17.7)
Observations	175	175	175	174

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

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**Chapter 5: Do Depression and/or PTSD Confound the Relationship between
Violence and Sexual Health among Adolescents Living in Baltimore?**

Introduction

Sexual health is one of the most important components of adolescent health and well-being. The previous paper analyzed the associations between violence and sexual behaviors. Perceptions of community violence were found to be associated with sexual activity in the last 12 months but less strongly or consistently associated with condom use at last sex for either gender. This was contrary to my hypotheses that violence would be more strongly associated with risky sexual behaviors (lack of condom use) than sexual activity. In this chapter, I study whether mental health confounds the relationships between violence and sexual behaviors. Thus, this paper explores whether mental health – specifically depression and PTSD – is associated with sexual behaviors and whether it confounds the previously observed associations between violence and sexual behaviors.

Depression diagnoses increase substantially during adolescence. By age 25, nearly 25% of people will report an episode of major depressive disorder at least once in their lifetimes¹ and up to 21% will have made an attempt to commit suicide.² Though research on differences in the prevalence of depression by race is inconclusive, evidence suggests that Black Americans with depression are less likely to receive a diagnosis and appropriate treatment.^{3,4}

Post-Traumatic Stress Disorder (PTSD) is also not an uncommon diagnosis in the United States. In analyses of the National Longitudinal Study of Adolescent Health (AddHealth), a representative sample of the US population ages 12 to 17, Kilpatrick et al. found that 6.3% of girls and 3.7% of boys reported PTSD symptoms.⁷ Experiences of PTSD, however, are not evenly distributed across the population, because exposure to trauma is not evenly distributed across the population. In particular, living in a poor,

urban area is associated with a higher number of potential traumas.⁸ Breslau et al. estimated that approximately 40% of poor, urban young adults (aged 21-30) in Detroit experienced trauma at some point in their lives and that a quarter of them developed PTSD.⁹

When symptoms of anxiety do not dissipate after a traumatic experience (like an accident, an injury, experience of violence, or a natural disaster), PTSD can be diagnosed. Most people return to normal functioning over time; however, some continue to suffer from symptoms associated with the trauma that may include re-living the trauma, anxiety, disassociation, distancing, and numbing.⁵ These symptoms are categorized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5th Edition) as post-traumatic stress symptoms and continuing symptoms may indicate PTSD.⁶

Experiencing violence – chronically or acutely – is related to poor mental health outcomes for children and adolescents. Adolescents who are exposed to violence, observe violence, or are victimized have higher rates of depression, suicidality, and PTSD.¹⁰ For example, adolescents with family members who have been killed by violence have higher rates of depression and PTSD.^{11,12} In the most extreme examples, observing violence and being victimized have been found to be associated with a wide variety of cognitive and mental health deficiencies including, but not limited to, “memory and consciousness, frequently including dissociation; emotional numbing; major developmental deficits; poorly developed, often fragmented, sense of self; a core belief that he or she is fatally flawed and has no right to be alive; a sense of hopelessness and shame; trust issues that interfere with normal relationships; and no concept of a future.”¹³ In children or adolescents exposed to adverse childhood experiences (ACEs) – of which violence is

one^{14,15} – the frequency of mental health disorders, including PTSD are likely more extreme than those not exposed to ACEs. Post et al., in a relatively small study of urban youth, found that nearly 50% of the adolescents reported PTSD symptoms and that many of the experiences of trauma were from experiences of domestic or community level violence.⁸ Also, in previous analyses of the Baltimore WAVE Study data, violence was associated with depression for both girls and boys.¹⁶

Mental health is in turn linked to sexual behavior. Poor mental health is associated with a number of risky sexual behaviors as well as activities that drive riskier sexual behaviors for both boys and girls. These behaviors include inconsistent condom use – especially amongst girls,¹⁷⁻¹⁹ – substance use before sexual activity,²⁰ a higher number of sexual partners,^{21,22} concurrent sexual partners,^{23,24} and abusive or coercive relations related to intimate partner violence.²⁵

The well-established links between violence and mental health, specifically PTSD and depression, and between these conditions and sexual behaviors suggests that mental health may confound the violence-sex relationships found in the previous chapter. In this chapter, I will test this idea. First, I investigate the relationship between mental health and sexual behavior (having had sex in the last year and using a condom at last sex). Then I assess whether including depression and/or PTSD attenuates the association between violence and these sexual behaviors, which would suggest that mental health may be a mechanism by which perceptions of community violence shape sexual behaviors.

Methods

The WAVE Study

Data for these analyses come from the Well-being of Adolescents in Vulnerable Environments (WAVE) study. The WAVE project aimed to understand the health of adolescents in vulnerable urban environments in five urban settings around the world with a focus on both their social and physical environments. This study focuses on Baltimore. The John Hopkins Bloomberg School of Public Health IRB approved all research protocols.

Study Sample

Respondent-Driven Sampling (RDS) was used to sample adolescents for the WAVE Study.²⁶ RDS is a chain-based recruitment strategy that uses “seeds” from the target population to recruit friends or acquaintances. RDS was used as traditional sampling methods – home based or school samples – might have missed unstably housed and out of school youth. To be eligible, respondents needed to live in one of five zip codes in East Baltimore, be between the ages of 15-19, and come in with an RDS “coupon.” Adolescents “seeds” were recruited from youth serving organizations in the neighborhood, informed about the purpose of the study, and consented to participate in a 20-30 minute Audio Computer-Assisted Self-Interview (ACASI) survey administered on a laptop in a Johns Hopkins building.²⁷ Once the “seed” respondents completed the survey, they were given three “coupons” that they could use to recruit eligible friends or peers and the chain continued in a similar manner.²⁸ Respondents were given \$20 for completing the survey and \$10 for each successful recruitment.

A total of 475 boys and girls were recruited in the Baltimore site. Respondents were excluded from this analysis for two reasons: if the overall quality of their responses was poor (n=19, based on total missing or repeated answers on the survey) or if they were missing answers to the key outcomes (n=10 for sex in the last year, n=22 for condom use). This resulted in a total analytic sample of 446 (257 boys and 189 girls). Flow charts (figures 5.1a and 5.1b) show total sample sizes for each outcome, which differed across models due to differences in the number of missing values on the three measures of violence.

Outcome and Exposure Measures

Two outcomes were analyzed: sexual activity in the last 12 months and condom use at last sex. A single question was used to assess *sexual activity in the last year*. The second outcome measure – *condom use at last sex* – was also assessed with a single question. Three measures that assessed individual perceptions of community violence – fear of violence, observation of violence, and personal victimization – were used as exposures in this analysis. All three scales were adapted from existing scales in the CDC’s Adolescent Violence Compendium.²⁹ All three scales – fear, observation, and victimization – were coded as binary measures for this analysis as responses were not normally distributed. A value of “0” means no experiences of violence were reported in the last year while a value of “1” means the respondent experienced violence in the last year.

Symptoms of depression were measured using the CESD-10 (Center for Epidemiological Studies in Depression). The 10 items assessed the frequency with which the respondent felt certain emotions in the past week.³⁰ Each item had four answer

choices coded from 0–3, resulting in an additive scale ranging from 0-30. Higher values indicated more depressive symptoms. The scale has been previously validated with binary cutoff point. So those who scored 10 or higher were coded “1” and defined as depressed while those with a 9 or lower were coded “0” and defined as not depressed.³⁰

PTSD was assessed using the Department of Veteran’s Affairs’ (VA’s) PTSD Civilian’s Checklist, which has been tested and validated in civilian populations.³¹ The full scale consists of 17 items about emotions and experiences in the past 30 days. Each item had five answer choices that were coded from 1–5, resulting in an additive scale ranging from 17-85. The higher the score, the more stress the respondent reported in the previous 30 days. In non-clinical settings, a threshold based on the underlying distribution of PTSD experiences in a specific population is applied to categorize respondents as having PTSD or not. For this analysis, the cutoff point was set at 36 and approximately one third of respondents were categorized as having PTSD. This is in line with the VA’s recommended cutoff point in a violence exposed non-veteran sample where they assume an underlying prevalence of 16-39%. This is also consistent with the distribution observed in other urban populations that have been studied.^{8,32} Sensitivity analyses were run with a cutoff point of 49 (where 16% of the sample was categorized as having PTSD) and are shown in the appendices.

If a person was missing three or fewer items on the depression scale, the missing item was imputed with the mean of that item in the full sample. Altogether, nine adolescents had missing values replaced (seven boys and two girls). If an individual was missing more than three items, their score was replaced with the overall mean on the scale (20 boys and five girls). Missing items on the PTSD scale were imputed with the

mean of that item if five or fewer items were missing (12 boys and 4 girls). If more than five items of the scale were missing, the mean of the entire scale replaced the missing value (18 boys and 10 girls).

Covariates

A number of covariates were included in these analyses based on previous research suggesting associations between these factors and sexual behaviors. Age was categorized in two groups: less than age 17 and age 17 and above, as older adolescents are more likely to be sexually active and may be less likely to use condoms as a function of the duration of their relationship.³³ The presence of an adult male or female who provides social support (categorized at the mid-point of a scale) was included as research suggests that the presence of an adult is associated with both better processing of violence and less engagement in risky behaviors.³⁴⁻³⁶ A variable about who raised the respondent (categorized as two parents or other) was included as youth who grow up with two parents are found to engage in less risky sexual behaviors.³⁷ Alcohol use in the last month (yes vs. no) was included as alcohol use has been found to be both a coping mechanism to violence and associated with riskier sexual behaviors.^{38,39} A single item from a scale on masculinity norms that measures whether or not the respondent believed that men “should be tough” (strongly agree vs. other) was included as a proxy for gender norms as research suggests imbalance in gender power impairs women’s ability to negotiate safe, consensual, and non-coercive sex.⁴⁰⁻⁴² Type of sexual partner (someone you were in a relationship with vs. other) was considered (in the analysis of condom use) because partner type is associated with correct and consistent condom use.^{43,44} All missing items

on covariates were replaced with the mean of that variable, with items on the social support scale being replaced in a similar manner to the mental health scales.

Analysis

Describing the prevalence of all covariates and exposures and then assessing differences in prevalence by gender was the first step in the analysis. The second step was to describe the bivariate relationships between each of the mental health variables and the violence variables, the outcomes, and the covariates. Significant differences in rates of depression and PTSD by each of these categories were tested with bivariate logistic regressions and all tests were stratified by gender.

The third step in the analysis was to fit logistic regressions to generate odds ratios and 95% confidence intervals (CIs) for the relationship between violence and sexual behaviors with the mental health variables included as confounders. These regressions were estimated separately by gender. For each outcome, there are four different logistic regression models; the first three models include each measure of violence separately and the final model (Model 4) includes all three violence measures together. By including all three measures of violence together, I am able to assess the independent effect of each on sexual activity or condom use. Each set of four regressions is estimated twice: first including the measure of depression and then including the measure of PTSD. Note that the odds ratios do not approximate the relative risk in these models, as the behaviors are relatively frequent.

All of the regression analyses adjust for covariates as described above. Type of partner was only included in the condom use models because individuals who were not

sexually active were unlikely to have an ongoing relationship. All of the models were estimated allowing for the clustering of respondents within recruitment chains.

Additionally, all models are weighted with RDS-II weights, which, based on the network size of each respondent, adjust for differential likelihood of selection into the sample. All models were tested for multicollinearity by assessing the variance inflation factor (VIF). All analyses were conducted in Stata 13.1.

In order to assess whether the mean replacement of missing items affected results, I conducted sensitivity analyses (not shown) where all respondents who were missing items were given either the highest value (1) or the lowest value (0) on those missing answers to explore how results changed. Odds ratios did not differ in significance for any of the key independent variables or the covariates.

Results

Table 5.1 reports the prevalence of the three exposures to violence. Seventy percent of girls reported experiences of fear versus 40% for boys ($p=0.0001$). Girls were also more likely to report observing violence (59%) compared to boys (54%) ($p<0.01$). There were no statistically significant differences in victimization by sex (girls: 30% vs. boys: 25%). The prevalence of the sexual behaviors are also shown in Table 5.1. A majority of both boys and girls report sexual activity in the last year, although boys were significantly more likely to engage in sexual activity than girls (65% versus 55%, $p = 0.001$). Boys also reported more condom use at last sex (61%) than girls (50%) although this was not statistically different ($p = 0.12$).

The prevalence of both depression and PTSD are shown in Table 5.2. Both

outcomes were fairly common in this sample. The prevalence of the two measures was approximately the same for girls with nearly 40% of girls reporting either depressive or PTSD symptoms. Just fewer than 30% of boys reported depressive symptoms while a quarter of boys reported PTSD symptoms. There were no significant differences by sex in terms of depressive symptoms ($p=0.629$) but girls were significantly more likely to report PTSD ($p=0.006$).

The percentages of adolescents who reported experiencing each of the mental health outcomes by the violence exposures and sexual health outcomes are shown in tables 5.2 and 5.3 respectively. There were strong relationships between violence exposures and mental health outcomes for both boys and girls (Table 5.2). While there was evidence in the bivariate models that PTSD was associated with sexual activity for girls, there were few other relationships between mental health and sexual behaviors for either boys or girls in the bivariate analyses (Table 5.3). To assess confounding, I compare the logistic regression models in this chapter to the results in the previous chapter and assess whether there are changes in the odds ratios. If odds ratios change by more than 10% there is evidence of confounding.

Overall, the results from the multivariate analyses for both genders provide little evidence for a confounding effect of depression or PTSD in the relationships between violence and sexual activity in the last year. Compared to the models in the first paper, there were very few changes in the odds of sexual activity given violence exposures for girls when mental health was adjusted for (Tables 5.4a and 5.4b). All three violence exposures were still associated with increased odds of sexual activity in the last year and fear was still attenuated in the final model. There were also no changes in the odds of

sexual activity related to violence exposures for boys after adjusting for mental health outcomes (Tables 5.6a and 5.6b), thus providing little evidence of confounding. Fear remained associated with lower odds of sexual activity in the last year for boys, while observation was still associated with higher odds of sexual activity.

Associations between violence exposure and condom use were also similar to the results in the previous chapter after adjusting for mental health for both boys and girls. Thus there is little evidence of a confounding effect of mental health on the associations between violence exposures and condom use. Similar to the models shown in the previous chapter, the odds of condom use were lower among girls reporting fear of violence in models 1 and 4 (Tables 5.5a and 5.5b). Other experiences of violence were not associated with condom use (Tables 5.5a and 5.5b). When PTSD was adjusted for, fear remained significantly associated with less condom use only in the final model that included all three violence exposures.

For boys, observation was associated with less condom use in both of the models adjusting for depression while other experiences of violence were not associated with condom use (Tables 5.7a and 5.7b). In the final model (model 4) after adjusting for PTSD, observation was no longer significantly associated with decreased condom use (Table: 5.7b, OR: .5, CI: 0.3-1.0); however, the odds ratios were of the same magnitude as seen in the previous paper (model without adjustment) and the confidence intervals were wider resulting in a marginally significant association.

Although there was no evidence of confounding, results indicate significant associations between mental health variables and sexual behaviors. While in the bivariate analyses there were no associations between mental health and sexual behaviors for girls,

the multivariate analyses showed evidence of associations between mental health and sexual behaviors for girls. This was not the case for boys. These results suggest that once adjusting for other covariates, mental health has more of an effect among girls than it has for boys on sexual behaviors. In the multivariate models, depression was associated with more sexual activity in both the single model (model 2) and the final model (model 4) (Table 5.4a) for girls. Similarly, PTSD was strongly associated with more sexual activity in all four models (Table 5.4b). For boys, neither depression nor PTSD was associated with sexual activity (Tables 5.6a and 5.6b). Depression was not associated with condom use for girls (Table 5.5a), while PTSD was significantly associated with lower odds of condom use in all four models (Table 5.5b). Neither depression nor PTSD was associated with condom use for boys (Tables 5.7a and 5.7b).

Discussion

These analyses show four interesting sets of results. First, mental health symptoms were more common for girls than boys. Second, there was evidence of association in the bivariate models between violence and mental health and, interestingly, given that the prevalence of mental health problems was higher for girls, these associations were stronger for boys than girls. In the multivariate models, there were associations between mental health outcomes and sexual behaviors for girls but not boys. Third, there was no evidence that mental health confounded the relationship between violence and sexual behaviors for either boys or girls.

The first interesting result was that there are important gender differences in mental health symptoms among poor, urban adolescents living in East Baltimore. Rates of depression were higher for girls compared to boys (though the difference was not

statistically significant). The pattern of higher rates for girls than boys is consistent with the literature that shows that depression is more frequent and chronic among adolescent girls compared to boys.⁴⁵ PTSD was also more frequent among girls than boys which was, again, consistent with other findings among urban adolescents.⁴⁶ Some studies have found no differences between boys and girls in mental health outcomes after violence exposure^{51,52} though, most find mental health to be more significantly associated with poor health for girls. In the literature, this pattern is apparent after violence exposure even though girls are less likely to be the victims of violence themselves.⁴⁷ Perrin et al. write that women are more likely to express neuroticism and anxiety after a traumatic experience, thus experiencing depression and PTSD after violence are likely gendered.⁴⁸ Cooley-Quille et al. distinguish between types of exposure when they note that young women are more likely to report mental health symptoms after a number of different types of violence experiences – reports, observations, and victimizations. They also report that young men are more likely to report poor mental health symptoms only if they or someone close to them is affected.^{49,50}

The second interesting result was that even though girls were more likely to report all three experiences of violence as well as depressive and trauma symptoms, there were surprisingly few associations between these exposures and outcomes for girls compared to boys in the bivariate analyses. In the multivariate analyses, this pattern no longer remained true as mental health was more likely to be associated with sexual practices for girls than the boys. However, the type of mental health outcomes that are studied may explain some of the previously observed patterns: women are more likely to report commonly studied internalizing disorders like depression.⁴⁸ Meanwhile, men are more

likely to report externalizing disorders^{53,54} and behaviors such as anger, fighting, and carrying a weapon after violence exposure^{49,55} which are often omitted in the mental health literature. Exploring these more “male” mental health outcomes may be important in subsequent analyses as none of the mental health variables were associated with the outcomes for the boys in these analyses.

Third, what comes across clearly in these analyses is that depression and PTSD do not confound the relationship between violence and sexual behaviors. The absence of practically any change in the association between violence and sexual behaviors after introducing mental health indicators suggests that depression and PTSD are not in the pathway linking violence to sexual health. Exploring other measures of mental well-being may be important before we entirely rule out that mental health confounds this relationship. For boys these might include more externalizing disorders like ADHD and the other behavioral disorders mentioned above. For girls these might include such measures as self-efficacy or self-esteem that are more measures of well-being than mental health per se.

Finally, there are important gender differences not only in the prevalences but also in the associations seen in the multivariate analyses. One possible explanation for these sex differences is in how these symptoms differentially affect boys’ and girls’ partnerships. The CESD-10 is not a measure of major depressive disorder and boys and girls fall differently on the spectrum of severity of their depressive symptoms (see Figure 5.2 at the end of this paper) as is seen in other studies.⁵⁷ This may mean that the more severe depressive symptoms for girls more strongly affect their relationships. For example, social norms encourage girls to focus on social and emotional relationships

while encouraging boys to be individually focused and goal-oriented.^{58,59} Thus, if girls are more likely to internalize their mental health challenges (including self-doubt, dissatisfaction, and guilt), such symptoms may have greater effect on their relationships and sexual partnerships than for boys. In contrast, if boys are more likely to externalize their feelings, suffer other forms of mental disorders, and be less likely to focus on their social and emotional relationships as opposed to other types of success like in school or employment, we might expect no associations. This suggests that depression and PTSD have greater effects on relationship behaviors for girls, especially once other relationship factors (parents, social support, partner type) are adjusted for.^{49,55,60,61}

More information about the causes of these traumatic experiences might also contribute to our understanding of these gender differences, particularly whether they are acute or chronic. Understanding chronicity or acuteness may be particularly related to fear as the data suggest that girls are less likely to be injured but have more trauma symptoms suggesting a chronic level of fear. Perhaps their experiences of trauma are less severe yet chronic while the experiences for men are more extreme – seeing someone shot in front of them – but less frequent. Assessing whether the causes and timing of violence explain the stronger associations between violence and mental health for girls and whether it might also explain some of the behavioral differences would be an important addition to the literature.

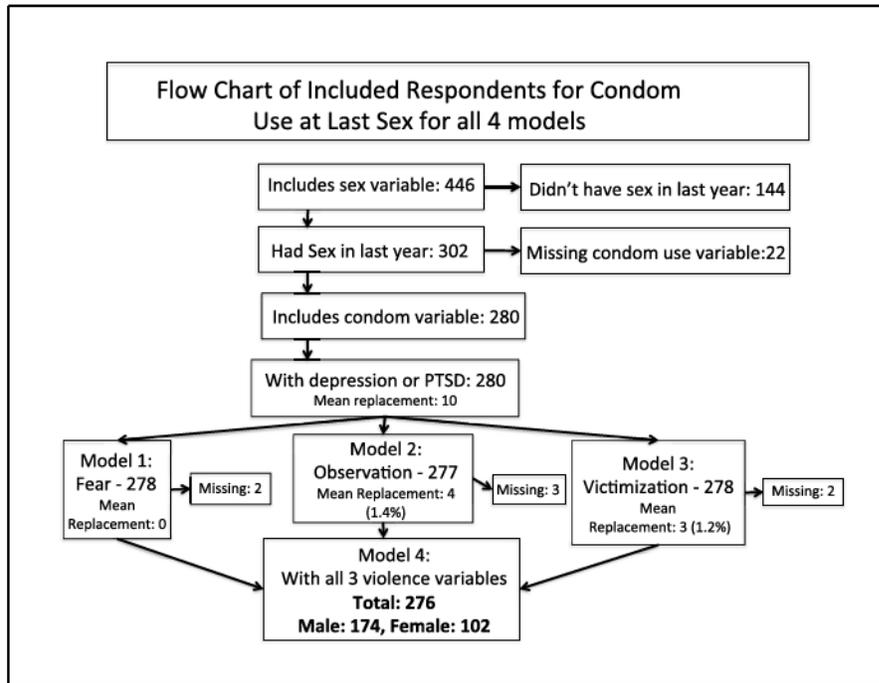
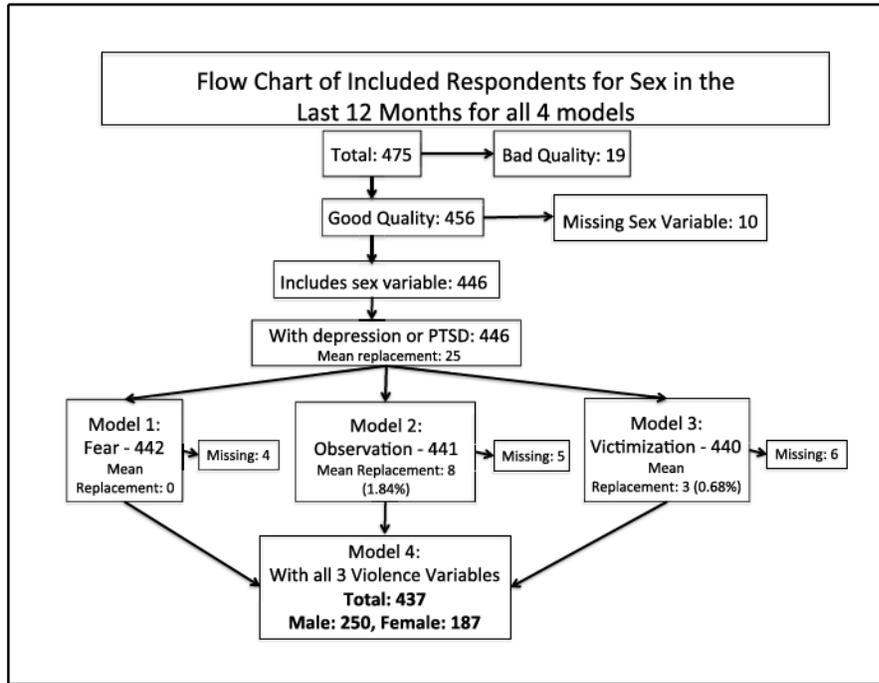
A final explanation for some of the gender differences is that it is possible that the boys who are most traumatized are “missing” from our sample – e.g. they are in jail or dead. The distribution of PTSD scores, shown in Figure 5.3, somewhat supports this idea. The distribution for the girls spreads further to the right and there are many more boys

who report no trauma symptoms. I cannot say definitely without reaching more of these potentially “missing” boys whether they show greater trauma or whether this is simply more evidence that girls experience more trauma symptoms than boys; however it deserves further exploration in samples of incarcerated young men.

Conclusion

Though the prevalence of violence and mental health issues are very high in this sample, mental health does not appear to confound the relationship between violence and sexual behaviors. While there was no evidence of confounding, depression and PTSD were both related to sexual behaviors among girls but not among boys. Exploring whether there are other measures of cognitive well-being – like self-efficacy, anger, ADHD, self-reflection or self-control – that are on the pathway between violence exposure and sexual behaviors may be an important next step in fully understanding the role of mental well-being in this process. Differences in social norms about violence, the types of violence experienced, a broader spectrum of mental health concerns and sample representation may all contribute to gender differences and deserve specific focus in future analyses.

Figures



Figures 5.1a and 5.1b: Flow Chart that Describe Analytic Samples for Models of Sex in the Last 12 Months with Mental Health Variables in Baltimore (above) and Condom Use at Last Sex with Mental health Variables in Baltimore (Below)

Table 5.1: Prevalence of All Covariates and Violence Variables, by Gender

Percentages are weighted; unweighted Ns shown in parentheses.

Weighted mean (weighted standard error shown in parentheses)

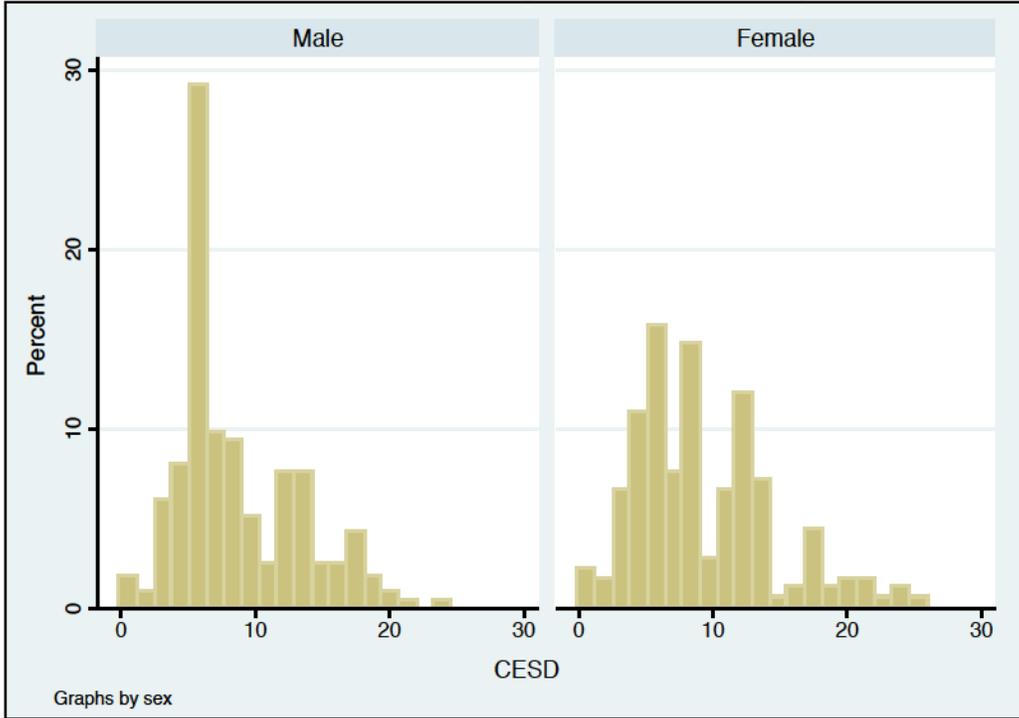
Baltimore Sample, 2013 WAVE Study

	Girls N=189	Boys N=257
Age Group		
15-16	49.0 (88)	59.4 (155)
17-19	51.0 (101)	40.6 (102)
Mean Age (SE)	16.4 (0.07)	16.1 (0.35)
Raised		
Two Parents	39.9 (64)	36.5 (84)
Other	60.1 (125)	63.5 (173)
Female Adult Social Support Scale		
Low	18.6 (24)	10.1 (33)
High	81.4 (165)	89.9 (220)
Male Adult Social Support Scale		
Low	37.9 (72)	28.9 (73)
High	62.1 (117)	71.1 (184)
Alcohol in the Last Month		
Yes	27.1 (52)	22.2 (62)
No	72.9 (137)	77.8 (195)
A Man Should be Tough		
Agree	30.4 (62)	50.7 (145)
Disagree	69.6 (127)	49.3 (112)
Partner Type	N=103	N=177
Relationship	82.7 (92)	59.2 (127)
Other	17.3 (16)	40.8 (66)
Fear		
Yes	70.2 (68)	40.6 (114)
No	19.8 (68)	59.4 (114)
Observation		
Yes	59.1 (124)	54.0 (157)
No	59.1 (63)	46.0 (97)
Victimization		
Yes	30.2 (61)	25.6 (77)
No	69.8 (128)	74.4 (174)
Sex in the Last 12 months	54.7 (109)	63.1 (193)
Condom Use at Last Sex	49.9 (50)	60.7 (102)

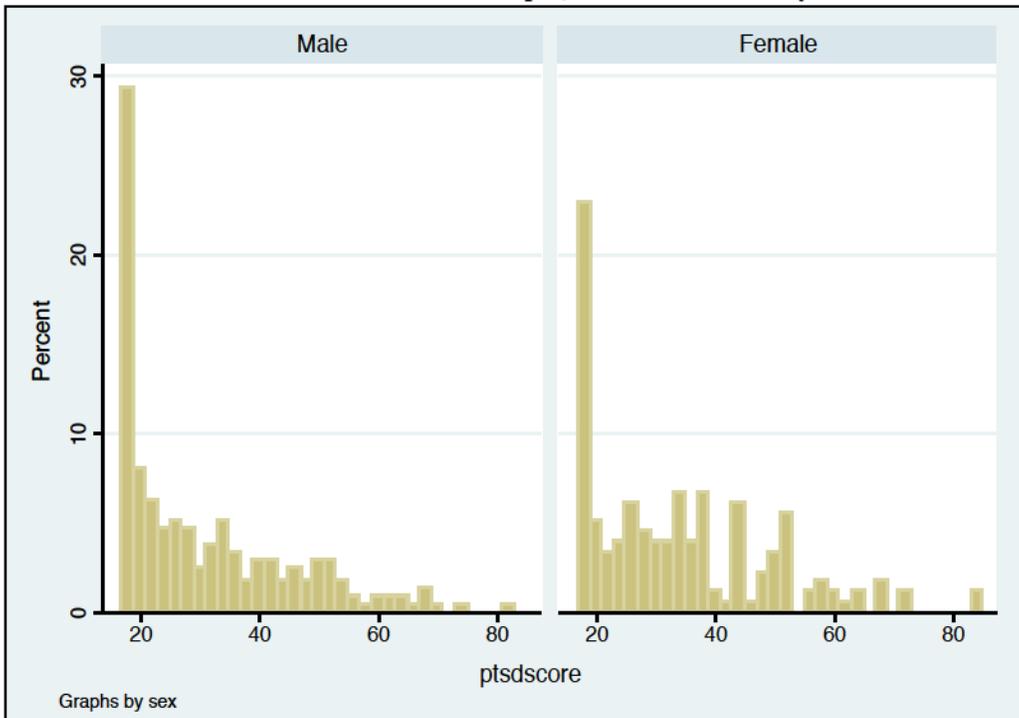
Table 5.2: Prevalence of Mental Health and Violence Variables, by Gender				
Percentages are weighted; unweighted Ns shown in parentheses.				
Weighted mean (weighted standard error shown in parentheses)				
Baltimore Sample, 2013 WAVE Study				
	Girls		Boys	
Total	37.9 (75/189)	38.4 (70/189)	27.9 (84/257)	23.8 (71/257)
	Depression (%, N)	PTSD (%, N)	Depression (%, N)	PTSD (%, N)
Fear	N=189	N=189	N=253	N=253
No	24.1 (23/68)	41.0 (25/68)	23.3 (37/139)	19.4 (33/139)
Yes	43.8 (52/121)	37.3 (45/121)	35.1 (47/114)	30.8 (38/114)
Observation	N=187	N=187	N=254	N=254
No	36.6 (24/63)	38.3 (18/63)	12.9 (23/97)	12.4 (17/97)
Yes	38.9 (50/124)	39.0 (52/124)	42.5 (61/157)	35.2 (54/157)
Victimization	N=189	N=189	N=251	N=251
No	34.6 (47/128)	36.4 (46/128)	19.8 (44/174)	15.1 (30/174)
Yes	45.5 (28/61)	43.0 (24/61)	56.8 (40/77)	53.9 (41/77)

Table 5.3: Prevalence of Mental Health and Sexual Activity Variables, by Gender				
Percentages are weighted; unweighted Ns shown in parentheses.				
Weighted mean (weighted standard error shown in parentheses)				
Baltimore Sample, 2013 WAVE Study				
	Girls		Boys	
	Depression (%, N)	PTSD (%, N)	Depression (%, N)	PTSD (%, N)
Sex in the Last 12 Months	N=189	N=189	N=257	N=257
No	35.3 (25/80)	28.5 (22/80)	20.8 (13/64)	20.6 (12/64)
Yes	40.1 (50/109)	46.6 (48/109)	30.6 (71/193)	25.1 (59/193)
Condom Use at Last Sex	N=103	N=103	N=177	N=177
No	41.3 (29/55)	52.4 (28/55)	32.0 (30/80)	26.5 (25/80)
Yes	34.9 (17/48)	38.8 (17/48)	32.0 (36/97)	22.3 (27/97)

**Figure 5.2 – Histogram of Distribution of Depression Scores, by Gender
Baltimore Sample, 2013 WAVE Study**



**Figure 5.3 – Histogram of Distribution of PTSD Scores, by Gender
Baltimore Sample, 2013 WAVE Study**



**Table 5.4a: Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Girls), adjusting for Depression
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.4** (1.2 - 1.7)			1.0 (0.8 - 1.4)
Observation		3.6*** (3.1 - 4.2)		3.2*** (2.8 - 3.6)
Victimization			3.1*** (2.3 - 4.1)	2.5*** (1.9 - 3.4)
Depression	1.7 (0.9 - 3.2)	1.7** (1.2 - 2.5)	1.6 (1.0 - 2.8)	1.6* (1.1 - 2.3)
Raised by Other (ref: 2 parents)	0.7* (0.5 - 0.9)	0.6* (0.4 - 0.9)	0.6** (0.4 - 0.8)	0.5** (0.4 - 0.8)
Adult Female Social Support	0.6* (0.3 - 0.9)	0.6* (0.3 - 0.9)	0.6** (0.4 - 0.8)	0.7* (0.5 - 0.9)
Adult Male Social Support	3.0*** (2.2 - 4.1)	3.4*** (2.2 - 5.2)	3.0*** (2.2 - 4.0)	3.5*** (2.3 - 5.3)
Age (ref: <17)	2.2** (1.4 - 3.4)	2.1*** (1.5 - 2.9)	2.3** (1.5 - 3.3)	2.2*** (1.7 - 3.0)
Alcohol Use Last Month	1.8** (1.3 - 2.6)	1.7** (1.3 - 2.2)	1.8** (1.3 - 2.5)	1.8*** (1.4 - 2.3)
Believe Men should be Tough	1.6 (0.8 - 3.0)	1.5 (0.9 - 2.6)	1.5 (0.8 - 2.7)	1.4 (0.9 - 2.3)
Constant	0.4* (0.2 - 0.9)	0.2** (0.1 - 0.5)	0.4** (0.2 - 0.7)	0.2*** (0.1 - 0.3)
Observations	189	187	189	187

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

Table 5.4b: Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Girls), adjusting for PTSD Baltimore Sample, 2013 WAVE Study

VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.6** (1.3 - 1.9)			1.2 (0.9 - 1.6)
Observation		3.8*** (3.3 - 4.3)		3.3*** (2.8 - 3.8)
Victimization			3.2*** (2.5 - 4.0)	2.6*** (1.9 - 3.4)
PTSD	2.2** (1.3 - 3.7)	2.4** (1.4 - 4.3)	2.2** (1.3 - 3.7)	2.5** (1.5 - 4.3)
Raised by Other (ref: 2 parents)	0.6** (0.5 - 0.8)	0.5** (0.3 - 0.7)	0.5** (0.4 - 0.7)	0.4** (0.3 - 0.7)
Adult Female Social Support	0.7 (0.5 - 1.1)	0.7 (0.5 - 1.1)	0.8* (0.6 - 1.0)	1.0 (0.8 - 1.1)
Adult Male Social Support	2.3*** (1.7 - 3.0)	2.5*** (1.8 - 3.5)	2.2*** (1.8 - 2.7)	2.7*** (1.9 - 3.7)
Age (ref: <17)	2.3* (1.3 - 4.2)	2.2** (1.5 - 3.3)	2.4** (1.4 - 4.1)	2.5*** (1.7 - 3.5)
Alcohol Use Last Month	1.5* (1.1 - 2.1)	1.4 (1.0 - 2.0)	1.5* (1.1 - 2.1)	1.4* (1.0 - 2.0)
Believe Men should be Tough	1.6 (0.8 - 3.0)	1.5 (0.9 - 2.5)	1.5 (0.8 - 2.7)	1.4 (0.9 - 2.4)
Constant	0.3** (0.2 - 0.6)	0.2*** (0.2 - 0.3)	0.4** (0.2 - 0.6)	0.1*** (0.1 - 0.2)
Observations	189	187	189	187

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

**Table 5.5a: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Girls), adjusting for Depression
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Condom Last Sex aOR	(2) Condom Last Sex aOR	(3) Condom Last Sex aOR	(4) Condom Last Sex aOR
Fear	0.3* (0.1 - 0.7)			0.3* (0.1 - 0.7)
Observation		1.3 (0.9 - 1.7)		1.2 (0.9 - 1.7)
Victimization			1.0 (0.6 - 1.6)	1.5 (0.9 - 2.3)
Depression	1.1 (0.5 - 2.5)	1.1 (0.6 - 1.9)	1.1 (0.7 - 1.7)	1.0 (0.5 - 2.0)
Raised by Other (ref: 2 parents)	1.6 (1.0 - 2.6)	1.8** (1.3 - 2.3)	1.9*** (1.5 - 2.5)	1.4 (0.9 - 2.2)
Adult Male Social Support	4.2*** (2.9 - 6.1)	4.7*** (3.2 - 7.0)	5.0*** (3.5 - 6.9)	4.2*** (2.8 - 6.2)
Age (ref: <17)	1.1 (0.8 - 1.6)	0.8 (0.6 - 1.1)	0.9 (0.7 - 1.1)	1.1 (0.7 - 1.7)
Alcohol Use Last Month	0.6 (0.3 - 1.3)	0.6 (0.3 - 1.1)	0.6 (0.3 - 1.2)	0.6 (0.3 - 1.2)
Believe Men should be Tough	0.9 (0.5 - 1.7)	1.1 (0.6 - 1.8)	1.2 (0.7 - 2.1)	0.8 (0.5 - 1.5)
Partner type	0.4*** (0.2 - 0.5)	0.3** (0.2 - 0.5)	0.3*** (0.2 - 0.5)	0.3*** (0.2 - 0.5)
Constant	0.8 (0.5 - 1.2)	0.3*** (0.2 - 0.4)	0.3*** (0.2 - 0.4)	0.7 (0.4 - 1.2)
Observations	103	102	103	102

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1
95% CI in parentheses

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

**Table 5.5b: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Girls), adjusting for PTSD
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Condom Last Sex aOR	(2) Condom Last Sex aOR	(3) Condom Last Sex aOR	(4) Condom Last Sex aOR
Fear	0.3 (0.1 - 1.0)			0.3* (0.1 - 0.9)
Observation		1.2 (0.9 - 1.8)		1.2 (0.7 - 1.9)
Victimization			1.1 (0.6 - 1.9)	1.5 (0.9 - 2.5)
PTSD	0.4* (0.2 - 0.8)	0.4*** (0.3 - 0.6)	0.4*** (0.3 - 0.6)	0.4** (0.2 - 0.7)
Raised by Other (ref: 2 parents)	1.4 (0.7 - 2.7)	1.6** (1.2 - 2.2)	1.7** (1.3 - 2.3)	1.2 (0.6 - 2.4)
Adult Male Social Support	4.5** (2.3 - 8.7)	5.2*** (2.6 - 10.1)	5.5*** (3.2 - 9.2)	4.6*** (2.4 - 8.8)
Age (ref: <17)	0.7 (0.5 - 1.0)	0.5** (0.4 - 0.7)	0.6** (0.4 - 0.7)	0.7 (0.5 - 1.1)
Alcohol Use Last Month	0.8 (0.3 - 1.8)	0.8 (0.4 - 1.4)	0.7 (0.4 - 1.5)	0.8 (0.4 - 1.7)
Believe Men should be Tough	0.9 (0.5 - 1.7)	1.0 (0.6 - 1.7)	1.1 (0.6 - 1.9)	0.8 (0.4 - 1.5)
Partner type	0.3** (0.2 - 0.5)	0.3** (0.1 - 0.6)	0.3** (0.1 - 0.5)	0.3** (0.2 - 0.5)
Constant	1.6 (1.0 - 2.5)	0.5 (0.2 - 1.2)	0.5* (0.3 - 0.9)	1.4 (0.9 - 2.2)
Observations	103	102	103	102

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

**Table 5.6a: Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Boys), adjusting for Depression
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4** (0.2 - 0.7)			0.4** (0.2 - 0.6)
Observation		2.5*** (1.7 - 3.7)		2.7** (1.5 - 4.9)
Victimization			1.9 (0.8 - 4.5)	1.7 (0.6 - 4.6)
Depression	1.6 (0.5 - 5.4)	0.9 (0.4 - 2.4)	1.0 (0.4 - 2.5)	0.9 (0.3 - 2.9)
Raised by Other (ref: 2 parents)	1.4 (0.8 - 2.7)	1.8* (1.1 - 3.0)	1.7 (0.9 - 3.2)	1.6 (1.0 - 2.6)
Adult Female Social Support	0.9 (0.1 - 6.8)	0.7 (0.1 - 4.9)	0.9 (0.1 - 7.9)	0.8 (0.1 - 6.8)
Adult Male Social Support	0.9 (0.3 - 2.5)	1.4 (0.4 - 4.3)	1.3 (0.4 - 4.0)	1.1 (0.4 - 2.9)
Age (ref: <17)	1.9** (1.3 - 2.7)	1.8* (1.1 - 2.7)	2.0** (1.4 - 2.7)	1.9* (1.0 - 3.5)
Alcohol Use Last Month	1.1* (1.0 - 1.2)	1.0 (0.8 - 1.3)	1.3** (1.2 - 1.5)	0.9 (0.6 - 1.2)
Believe Men should be Tough	1.1 (0.6 - 2.0)	1.2 (0.6 - 2.3)	1.3 (0.7 - 2.5)	1.1 (0.6 - 2.0)
Constant	2.5 (0.2 - 32.9)	0.9 (0.0 - 17.3)	0.9 (0.0 - 16.4)	1.3 (0.1 - 16.6)
Observations	253	254	251	250

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

Table 5.6b: Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Boys), adjusting for PTSD Baltimore Sample, 2013 WAVE Study

VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4*** (0.3 - 0.6)			0.4*** (0.2 - 0.6)
Observation		2.6*** (2.1 - 3.2)		2.8** (1.7 - 4.4)
Victimization			2.1 (0.6 - 7.1)	1.8 (0.5 - 6.9)
PTSD	1.2 (0.9 - 1.7)	0.8 (0.6 - 1.0)	0.7 (0.4 - 1.5)	0.7 (0.4 - 1.2)
Raised by Other (ref: 2 parents)	1.4 (0.7 - 2.9)	1.8* (1.0 - 3.2)	1.8 (0.9 - 3.5)	1.6 (0.9 - 2.9)
Adult Female Social Support	0.9 (0.1 - 5.2)	0.7 (0.1 - 4.7)	0.9 (0.1 - 7.6)	0.8 (0.1 - 6.4)
Adult Male Social Support	0.9 (0.3 - 2.5)	1.4 (0.5 - 4.0)	1.3 (0.5 - 3.7)	1.1 (0.5 - 2.6)
Age (ref: <17)	1.8** (1.3 - 2.6)	1.8* (1.1 - 2.8)	2.0** (1.4 - 2.9)	1.9 (1.0 - 3.7)
Alcohol Use Last Month	1.3 (0.9 - 1.8)	1.1 (0.7 - 1.7)	1.4 (0.9 - 2.0)	0.9 (0.5 - 1.5)
Believe Men should be Tough	1.1 (0.6 - 2.2)	1.2 (0.6 - 2.4)	1.3 (0.7 - 2.6)	1.1 (0.6 - 2.0)
Constant	2.7 (0.3 - 27.9)	0.9 (0.1 - 17.3)	0.9 (0.0 - 15.9)	1.4 (0.1 - 16.4)
Observations	253	254	251	250

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

**Table 5.7a: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Boys), adjusting for Depression
Baltimore Sample, 2013 WAVE Study**

VARIABLES	(1) Condom Last Sex aOR	(2) Condom Last Sex aOR	(3) Condom Last Sex aOR	(4) Condom Last Sex aOR
Fear	1.0 (0.5 - 2.2)			1.1 (0.4 - 2.8)
Observation		0.4** (0.3 - 0.8)		0.5* (0.3 - 0.9)
Victimization			0.4 (0.1 - 1.3)	0.6 (0.1 - 2.2)
Depression	0.8 (0.3 - 2.4)	1.1 (0.4 - 3.1)	1.2 (0.6 - 2.3)	1.3 (0.6 - 2.7)
Raised by Other (ref: 2 parents)	4.6*** (3.2 - 6.8)	3.5** (2.0 - 6.2)	3.8** (1.9 - 7.8)	3.8*** (2.2 - 6.8)
Adult Male Social Support	3.3*** (2.2 - 5.0)	2.5* (1.3 - 5.0)	2.5** (1.5 - 4.2)	2.5** (1.4 - 4.5)
Age (ref: <17)	0.5** (0.3 - 0.7)	0.5** (0.3 - 0.8)	0.5*** (0.3 - 0.6)	0.4** (0.3 - 0.6)
Alcohol Use Last Month	0.9 (0.5 - 1.5)	0.9 (0.5 - 1.7)	0.8 (0.5 - 1.4)	0.9 (0.5 - 1.6)
Believe Men should be Tough	0.8 (0.4 - 1.4)	0.8 (0.4 - 1.4)	0.7 (0.4 - 1.2)	0.8 (0.4 - 1.5)
Partner type	0.3* (0.1 - 0.9)	0.3 (0.1 - 1.1)	0.3* (0.1 - 0.8)	0.3* (0.1 - 0.9)
Constant	0.6 (0.2 - 2.5)	1.4 (0.2 - 10.3)	1.1 (0.3 - 4.6)	1.5 (0.2 - 9.4)
Observations	175	175	175	174

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

Table 5.7b: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Boys), adjusting for PTSD Baltimore Sample, 2013 WAVE Study

VARIABLES	(1) Condom Last Sex aOR	(2) Condom Last Sex aOR	(3) Condom Last Sex aOR	(4) Condom Last Sex aOR
Fear	1.0 (0.5 - 2.2)			1.1 (0.4 - 2.9)
Observation		0.5** (0.3 - 0.8)		0.5 (0.3 - 1.0)
Victimization			0.5 (0.1 - 1.8)	0.7 (0.1 - 3.5)
PTSD	0.5 (0.2 - 1.9)	0.7 (0.2 - 2.2)	0.8 (0.3 - 2.3)	0.8 (0.2 - 2.5)
Raised by Other (ref: 2 parents)	4.8*** (3.0 - 7.8)	3.7** (2.0 - 6.8)	3.9** (1.9 - 8.0)	3.9** (2.2 - 7.0)
Adult Male Social Support	3.4*** (2.3 - 5.2)	2.6* (1.3 - 5.2)	2.6** (1.6 - 4.1)	2.6** (1.5 - 4.5)
Age (ref: <17)	0.5** (0.3 - 0.7)	0.5** (0.3 - 0.7)	0.5*** (0.3 - 0.6)	0.4** (0.3 - 0.6)
Alcohol Use Last Month	0.9 (0.5 - 1.6)	1.0 (0.5 - 1.9)	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.8)
Believe Men should be Tough	0.8 (0.4 - 1.5)	0.8 (0.5 - 1.4)	0.7 (0.4 - 1.2)	0.8 (0.5 - 1.6)
Partner type	0.3* (0.1 - 0.9)	0.3 (0.1 - 1.1)	0.3* (0.1 - 0.8)	0.3* (0.1 - 0.9)
Constant	0.7 (0.1 - 3.1)	1.4 (0.2 - 11.6)	1.1 (0.2 - 4.8)	1.4 (0.2 - 9.5)
Observations	175	175	175	174

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% CI in parentheses

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

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**Chapter 6: Baltimore and Johannesburg: Are the relationships between violence
and sexual health similar?**

Introduction

In the previous two chapters, I studied how experiences of community violence were associated with sexual behaviors among disadvantaged youth in Baltimore, MD. This paper will compare the associations among violence, mental health, and sexual behaviors in Baltimore and in Johannesburg, South Africa in order to better understand how structural context affects these relationships. As in the United States (U.S.), most research on violence and sexual health in South Africa pertains to IPV/GBV, showing strong associations between IPV/GBV and poor sexual and reproductive health outcomes.¹⁻⁴ Also similar to the U.S., there is minimal literature exploring the link between community violence and sexual health; however, initial work suggests such a relationship. For example, Otworld et. al. have found that witnessing violence or being victimized by someone other than a family member was associated with a higher number of sexual partners.⁵

Baltimore and Johannesburg are different in many ways. Baltimore is in a wealthier nation with more overall resources and a more diverse and stable economy. Many more people in Johannesburg live in extreme poverty without housing, running water, electricity, or access to healthcare services. Johannesburg has a much greater prevalence of HIV, putting strain on the health care system, increasing the number of young people who are orphaned, and increasing the risk of infection at each sexual encounter. South African norms around gender, especially masculinity, fuel higher levels of sexual violence which tend to increase young people's risk for HIV, other STIs and unintended pregnancies;^{1,3,6} while myths about how to rid oneself of HIV – having sex with a virgin for instance – also lead to higher levels of sexual violence.⁷

However, the two cities are also similar in a number of important ways. In particular, both cities have pockets of extreme poverty and some of the poorest neighborhoods are situated in close proximity to some of the wealthiest. Both cities have strong histories of government-enforced racial segregation. These policies have left a legacy of neighborhood segregation, so that people of different races live in seemingly separate realities. This segregation is associated with increased unemployment, poor infrastructure, and low educational attainment for people living in poor neighborhoods. Finally, both cities have very high rates of crime.

There are three reasons why reactions to violence might be similar in these two cities in spite of their many differences. First, the similarities described above in terms of structures and the history of racial segregation may be important drivers of violence, educational and employment opportunities, and sexual networks in these two places. These structural and historical similarities may lead to parallel associations between violence and sexual behaviors among adolescents.

Second, psychological responses to violence are likely common in a variety of settings. Similar to in the U.S., adolescents in South Africa are more likely to report poor mental health,^{8,9} sleep deprivation,¹⁰ poor school performance,¹¹ and substance use¹² after exposures to violence. These common behavioral responses to violence suggest that there might be either underlying biologic processes or common narratives around violence that shape behaviors and processing. These could also lead to similar sexual behaviors following violence. Comparing outcomes in such different contexts helps us to understand whether there are universal pathways between exposures and outcomes and how interventions that have been successful in one place might work in another.

Therefore, I hypothesize, that there may be common experiences linking community violence and sexual behaviors in the two sites.

Third, adolescents transitioning to adulthood in different parts of the world increasingly experience common pressures and constraints. The word “globalization” defines a phenomenon where the world is more and more intertwined, where more than ever before, a person’s opportunities on one side of the world are influenced by the monetary flows and exchange rates, media and norms, diseases, natural disasters, and revolutions on the other side of the world.¹³ In their study “Growing Up Global,” Lloyd et al. describe how the multiple levels that affect adolescent health and development in the global context may lead to increasingly similar struggles.¹⁴ Specifically, they argue that the rapidly changing global context affects both economic opportunities as well as national and local behavioral norms. They also argue that these common experiences have the potential to relegate particularly marginalized people and communities to the sidelines.¹⁴

For adolescents around the world, an increasingly common experience, driven by globalization, is rapid urbanization. More people around the world live in cities today than ever before;¹⁵ and all expected global population growth in the next 20 years is predicted to happen in cities.¹⁶ Glaeser argues that poor countries can now support large cities in a way that they could not have done before because products – food, medicines, and infrastructure materials – can be imported in open economies.¹⁷ Yet, many of the historical problems – such as poor sanitation, substandard housing, or air pollution – contribute to increasing social disparities in health in urban settings.¹⁷⁻¹⁹ Violence is a common feature of urban life, which adolescents are most likely to be both exposed to

and perpetrate.²⁰⁻²³ This is driven by the fact that young people who live in poor, urban areas are more likely to be socially disconnected – unemployed, out of school, working in illegal sectors or in work that is unfulfilling – and these youth are the most likely to experience violence.²⁰ In the global south, where young people live in slum and informal, urban housing,¹⁹ mega-city growth is happening faster than policy and infrastructure can keep up with. While, in the global north, former industrial and manufacturing centers have lost jobs to cheaper overseas sites and technology and violence, unemployment, and disconnectedness are common among youth as well.²⁴

At the same time that adolescents navigate a world of violence in poor urban neighborhoods, they are more likely to suffer poor sexual health outcomes such as unplanned or high-risk pregnancies.^{25,26} Rates of sexually transmitted infections (STIs)²⁷ are highest among adolescent and young adult populations. The relationship between community violence and sexual health outcomes has begun to be explored,²⁸ yet little is known about the mechanisms through which violence might be related to unsafe sexual behaviors, that put young people at risk for unplanned pregnancies and STIs.

In this paper, I test the theoretical idea that sexual behaviors for adolescents who experience violent situations are similar in two different settings despite the historical and cultural differences between the two places. I first examine the relationship between community violence and sexual health in Johannesburg. Then I compare these findings to the findings for Baltimore presented in the previous two chapters.

Methods

The WAVE Study and Sample in Johannesburg

As in the previous chapters, the data for these analyses are drawn from the Well-Being of Adolescents in Vulnerable Environments (WAVE) Study. The Johns Hopkins Bloomberg School of Public Health Institutional Review Board and the Human Research Ethics Committee at the University of Witwatersrand in Johannesburg approved all research protocols and survey instruments for both sites.

As previously described, young people were recruited using respondent-driven sampling (RDS). In Johannesburg, eligible adolescents lived in the Hillbrow neighborhood of Johannesburg (near the Central Business District). Age and coupon recruitment remained the same as in Baltimore. RDS was used to specifically target unstably housed and out of school youth, populations otherwise difficult to reach.^{29,30}

In Johannesburg 497 respondents were recruited to participate in the study. One person was dropped because the quality of their answers was deemed too low – as described in the Chapter 3. Respondents were also excluded if they were missing answers to either the outcome variables or the key exposures (violence variables). Eight people did not answer the sexual activity in the last year question in Johannesburg (seven boys and one girl). Analysis of condom use at last sex was conducted among respondents who reported sexual activity in the last 12 months and provided information about condom use at last sex. In Johannesburg, 56 boys and 94 girls reported never having had sex, while 53 boys and 26 girls reported sex prior to the last year. Six boys and two girls who had had sex in the last year were missing information on condom use.

Therefore, the final analytical sample included 487 adolescents in Johannesburg (264 boys and 223 girls) for the sexual intercourse analysis. There were 250 respondents in Johannesburg (100 girls and 150 boys) for the condom use model. See Figures 6.1a and 6.1b (at the end of the chapter) that show the flow charts of total sample sizes for each of the 2 regressions in Johannesburg.

Measures

All of the measures, except for the PTSD scale (see below), are the same as the ones that were described in Chapters 4 and 5 in the Baltimore analyses; and all missing data was handled in a similar fashion. There were seven key variables included in these analyses: three violence exposure variables, two sexual behavioral outcomes, and two mental health variables conceptualized as mediators but tested as confounders. The two outcome measures – assessed with a single question each in the survey – were sexual activity in the last 12 months and condom use at last sex. The *depression* scale was drawn from the CESD-10 (Center for Epidemiological Studies in Depression, 10 items) instrument assessing depressive symptoms in the prior seven days.³¹ Higher scores imply more depressive symptoms and a score of 10 or higher is categorized as depressed in these analyses.

The one variable that was operationalized differently in the analyses in Johannesburg is the scale assessing *post-traumatic stress disorder (PTSD)*. This was assessed with the PTSD Civilian's Checklist, which has been tested and validated in civilian populations.³² However, in Johannesburg, a modified and shortened version of the scale with six items was used. The full PTSD measure consisted of 17 items about

how experiences in the past 30 days affect one's coping today. A higher score indicates that the respondent reported more stress in the previous 30 days. In non-diagnostic settings, the scale is used as an additive scale. The PTSD checklist does not have a set cut off point. Instead, a priori understanding of the distribution in the underlying population typically guides the decisions about where to set the cut off. Therefore, cutoffs on the scale vary across different settings. In Baltimore we used a cutoff point of 36 and in Johannesburg a cutoff of 16. Higher cutoffs (of 49 and 20) were used to conduct sensitivity analyses. Results from these regressions are included in the appendices.

The same demographic characteristics were considered as covariates in the Johannesburg analyses as described in Chapters 4 and 5 in Baltimore. Because the entire scale for the gender and masculinity norms lacked good internal consistency measures in Johannesburg, ($\alpha=0.6568$), I elected to use just one item—an item measuring whether or not the respondent believed that men should be tough (categorized as strongly agree versus anything else)—in our calculations in both settings.

Analysis

The first step in this analysis – as in the previous chapters – was to describe the prevalence of all covariates and exposures. I then assessed differences in prevalence across site to detect significant differences in exposures, outcomes, and covariates. Analyses were stratified by gender. The second step was to test whether the associations between violence and sexual behaviors were similar in Johannesburg to those found in Baltimore. Interactive models were run to test for differences in the association between violence and sexual behaviors across cities. These interactive models allowed for a

formal testing of differences in the odds of sexual health outcomes by violence measures in Johannesburg as compared to Baltimore. Models that were similar to chapter 5 (although they include depression and PTSD in the same models) were run interacting city with each of the violence variables individually. The final model (that adjusts for all three violence variables) only includes interactions that were found to be significant in the first three models.

Following the analysis of interactions, stratified models were run by city adjusting for the same set of covariates in order to report the odds ratios of sexual indicators by violence measures in Johannesburg. Bar charts of the odds ratios in both cities are presented, while the full regression results are included in the appendix. Analyses excluding mental health variables (similar to Chapter 4) are shown in the appendix as are models interacting city with the mental health variables.

Multicollinearity was assessed using the variance inflation factor (VIF). No VIFs were greater than 2 suggesting that multicollinearity was not a concern. Because the behaviors in each of these models are relatively frequent, it is important to remember that the odds ratios in these analyses do not represent the relative risk. All analysis were weighted using RDS-II weights to adjust for population level differences. Clustering was also used to account for interrelation of subjects recruited through the same seed. Non-weighted models are included in the appendix. Stata 13.1 was used to conduct all analyses. Sensitivity analyses – not shown – were also run on missing variables in a similar fashion to that described in previous chapters.

Results

The demographic composition of the study samples differed by city, as shown in Table 6.1. Baltimore respondents were younger than Johannesburg respondents. Boys in Baltimore were more likely to report social support from a female adult in their homes than boys in Johannesburg. Young people in Baltimore were less likely to report drinking alcohol in the past month than in Johannesburg. Finally, adolescents in Johannesburg were more likely to report that the last person they had had sex with was someone they were in a relationship with (a boyfriend or girlfriend).

Table 6.2 shows that the distribution of exposures and outcomes for each gender also differed by city. Boys in Johannesburg were more likely to report being fearful, to have observed violence, and to have been victimized than boys in Baltimore. Girls in Johannesburg were significantly more likely to report fear and victimization than girls in Baltimore. Depression was more common in Johannesburg. There were no differences in PTSD rates though this should be interpreted cautiously since cutoffs were calculated based on assumed underlying prevalence. Sexual activity in the last year was less common in Johannesburg for both boys and girls. Conversely, condom use at last sex was more frequently reported for both sexes in Johannesburg and boys were more likely to report condoms than girls (in contrast to Baltimore where the opposite was true).

Tables 6.3a (sex in the last 12 months) and 6.3b (condom use at last sex) show results of the logistic regressions that include the interactive results. Girls are shown on the left and boys on the right and the data are pooled across sites. Results from the interactive models indicate two statistically significant differences between the association between violence and sexual activity according to site: for girls the effects of

observation and victimization on sexual activity were significantly lower in Johannesburg than in Baltimore. Specifically, the odds of sexual activity among girls who observed violence in Johannesburg were 60% lower than among girls who observed violence in Baltimore (OR=0.6[0.4-0.7]). Likewise, the odds of sexual activity among girls who were victimized in Johannesburg were 20% lower than among girls who were victimized in Baltimore (OR=0.8[0.7-0.1.0]). There were no statistically significant interactions for boys.

In order to better understand what this means by site, the stratified results show the specific odds ratios for both Baltimore and Johannesburg. In the stratified models per site, the same patterns emerge. The odds of sexual activity related to observation were greater than 1 in both sites for girls (Table 6.4a: models 2a and 2b) but substantially higher in Baltimore compared to Johannesburg, as reported in the previous paragraph. The odds of sexual activity related to victimization moved in different directions in the two cities (Table 6.4a: models 3a and 3b). In Baltimore, victimization was associated with significantly higher odds of sexual activity in the last year among girls while the reverse was true in Johannesburg.

For boys (Table 6.4b) only fear was significantly associated with sexual activity in Johannesburg and, similar to Baltimore, was associated with less sexual activity. Observation was significantly associated with more sexual activity in Baltimore and though the odds ratio was greater than one in Johannesburg it was not significant.

Tables 6.5a (girls) and 6.5b (boys) show results of the logistic regressions exploring the associations between each form of violence and condom use at last sex by gender and site. The interactive models showed no significant differences in the odds

ratios by site. The lack of statistical significance in the interactive models may be a function of the smaller sample sizes in these models and thus odds ratios and differences must be interpreted cautiously.

Among girls, fear was associated with lower odds of condom use in Baltimore (Table 6.5a, model 1a). The same pattern was observed in Johannesburg although not significant (Table 6.5a, model 1b). Observation and victimization were not significantly related to condom use in either city. The lower odds of condom use associated with observation and victimization in Johannesburg are noticeable, although wide confidence intervals limit the interpretation of these results (Table 6.5a: models 2a-3b).

For boys, differences in effects of violence on condom use for boys in both sites were not significant. In Baltimore, observing violence was significantly associated with less condom use (Table 6.5b, model 2a) while the opposite was true but non-significant in Johannesburg (Table 6.5b: models 1b and 3b).

As was the case for Baltimore, we found no evidence of a confounding effect of depression or PTSD on sexual behaviors in Johannesburg.

Discussion

This study reveals both similarities and differences in the associations between violence and sexual behaviors among adolescents living in two poor, urban yet contextually and culturally distinct environments, Baltimore and Johannesburg. Youth in Johannesburg reported higher exposure to violence but lower levels of sexual activity in the last twelve months. They also reported higher levels of condom use. Associations between violence and sexual activity were generally consistent across sites (except for victimization for

girls). Associations between violence and condom were also consistent across sites in the interactive models, although the stratified models hinted that there might be differences that did not attain statistical significance due to a smaller sample size. In neither site was there evidence to suggest that mental health confounded the relationships between violence and sexual behaviors.

In both sites, sexual activity in the last 12 months was frequent, suggesting most youth transition to becoming sexually experienced during middle to late adolescent years in both of these poor, urban settings. While many youth were sexually active in both sites, preventive behavior differed by site. Condom use was substantially higher in Johannesburg, potentially due to the influence of the HIV pandemic in the region. Educational campaigns as well as personal experiences of HIV among relatives and close friends are more common among youth in South Africa and might increase condom use regardless of how or where violence occurs. Though the results must be interpreted cautiously, similarities in the patterns of sexual activity and differences in the patterns of condom use may partly explain consistencies across sites in the associations between violence and sexual activity and differences across sites in the relationship between violence and condom use. This pattern suggests that among poor, urban adolescents, condom use may be shaped by context more than sexual activity is although this needs to be tested in studies with bigger sample sizes.

Mental health did not appear to confound the relationships between violence and sexual behaviors in either city. Other measures of social, emotional, and cognitive well-being may have more relevance to risky sexual behaviors than poor mental health – e.g. impulse control, self-efficacy, or self-confidence, which have also been found to be

associated with violence.^{33,34} Previous IPV research has found an association between self-efficacy around consistent condom use and sexual consent³⁵ while also suggesting that self-identity and self-efficacy take longer to rebound after experiences of sexual violence.³⁶⁻³⁸ Work on contraceptive use has also found that the respondents' with the lowest sense of self-efficacy were more likely to have unintended pregnancies – and sometimes repeated ones³⁹ – and young HIV+ women with higher self-efficacy scores were better able to engage in protected intercourse.⁴⁰ One way that that violence might affect self-efficacy is by influencing women's sense of autonomy and ability to openly communicate about fears, wants and desires.⁴¹

Thus, social cognitive theory, as a theoretical lens, may help explain why self-efficacy or impulse-control, for example, might shape people's abilities to engage in less risky behaviors after experiences of violence. In South Africa, an intervention that used a social cognitive theory as well as education increased consistent condom use more than just an education program did.⁴² These measures should be considered as potential confounders in future analyses.

The fact that there are greater differences across site for girls than for boys is an interesting pattern. None of the interaction terms were significant for boys while some were for girls. This suggests that sexual norms for young women may be more shaped by the contextual norms while global norms potentially shape behavior more for young men. Or it might also suggest that differences in gender inequalities are more likely to shape women's behaviors than men's behaviors. It is also possible that the lack of significance for boys means that we have not explored the main predictors of young men's sexual activity or that, as discussed in Chapter 5, the most traumatized young men are “missing”

from these samples as they are dead, jailed, or working elsewhere. Thus the similarity in the lack of significance found here should perhaps not be interpreted as similarity as much as a lack of difference.

Considering the initial hypothesis – that despite contextual differences by site, the associations between violence and sexual behaviors would be similar – these results provide initial evidence to support that hypothesis. There were some differences for girls and the similarity in the condom results must be interpreted cautiously given the small sample size; however, there were a number of similarities across the two sites – suggesting that there is space for future cross-national comparisons like this one that study common exposures and outcomes and explore whether similar pathways can explain the patterns. The cross-national comparisons also shed light on important differences that might drive the condom differences – such as fear of HIV and success of educational campaigns around condom use that might explain mechanistic processes.

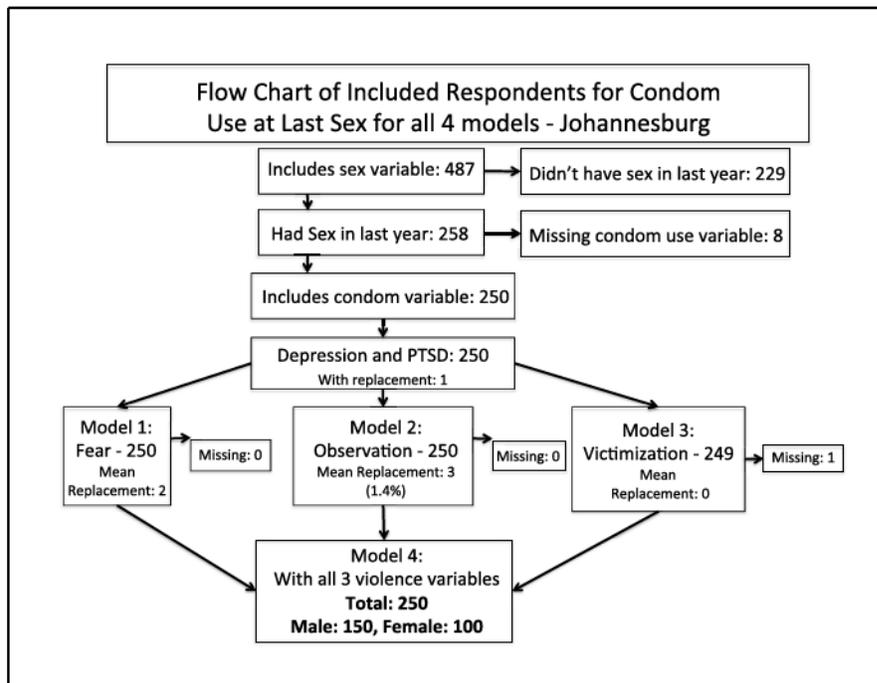
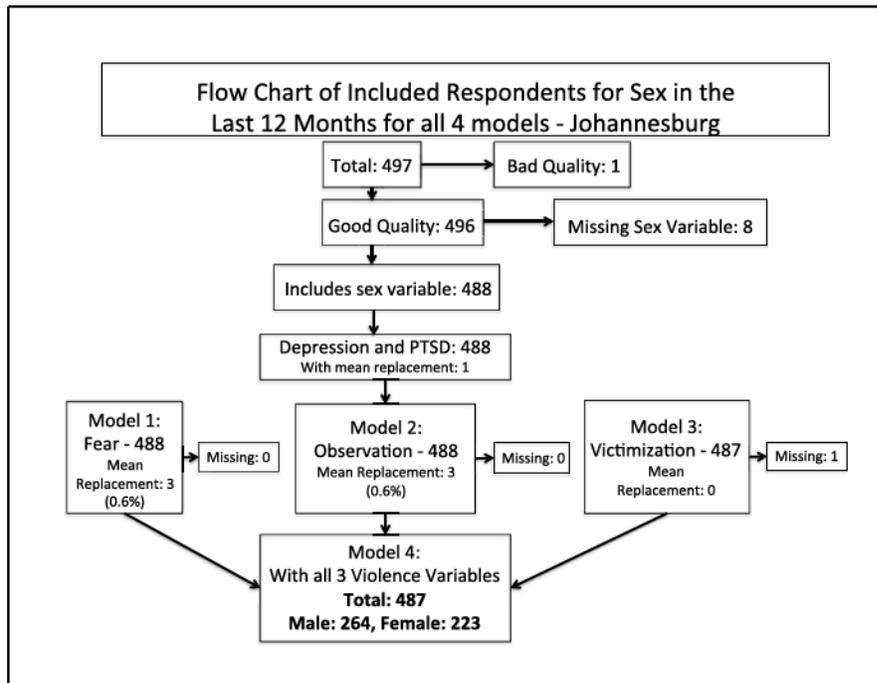
Conclusion

Experiences of violence among teenagers in both Baltimore and Johannesburg are very common. Young people report high levels of fear, observation of violence, and victimization in both sites. These experiences of violence are generally associated with sexual activity, with the exception of fear among boys in both sites and victimization among girls in Johannesburg. The pattern that mental health does not appear to confound these associations in either site is compelling.

In general, the patterns are similar in many ways. Young people living in poor urban environments may share experiences that are important to their health and

development and exploring them in different settings may help us understand better the mechanisms. Even if those mechanisms are ultimately different the comparisons can provide useful conceptual models. These results begin to provide support for the theory that there may be similarities in behaviors even across contexts that are different in important ways. There are some important differences – that have been noted – but the similarities should encourage us to think more about comparisons across the global north and south as knowledge and learning in one setting may inform patterns in other places.

Figures



Figures 6.1a and 6.1b: Flow Chart that Describe Analytic Samples for Models of Sex in the Last 12 Months with Mental Health Variables in Johannesburg (above) and Condom Use at Last Sex with Mental health Variables in in Johannesburg (Below)

Table 6.1: Prevalence of All Covariates and Violence Variables, by Gender

Percentages are weighted; unweighted Ns shown in parentheses.

Weighted mean (weighted standard error shown in parentheses)

Baltimore and Johannesburg Samples, 2013 WAVE Study

	Baltimore Girls N=189	Johannesburg Girls N= 223	Baltimore Boys N=257	Johannesburg Boys N= 265
Age Group				
15-16	49.0 (88/189)	26.1 (53/223)	59.4 (155/257)	31.5 (69/265)
17-19	51.0 (101/189)	73.9 (170/223)	40.6 (102/257)	68.5 (196/265)
Mean Age (SE)	16.4 (0.07)	17.3 (0.18)	16.1 (0.35)	17.1 (0.24)
Raised				
Two Parents	39.9 (64/189)	39.9 (81/223)	36.5 (84/257)	28.6 (82/265)
Other	60.1 (125/189)	60.1 (142/223)	63.5 (173/257)	71.4 (163/265)
Female Adult Social Support Scale				
Low	18.6 (24/189)	20.0 (42/223)	10.1 (33/257)	21.7 (56/265)
High	81.4 (165/189)	80.0 (181/223)	89.9 (220/257)	78.3 (209/265)
Male Adult Social Support Scale				
Low	37.9 (72/189)	38.7 (83/223)	28.9 (73/257)	34.4 (86/265)
High	62.1 (117/189)	61.3 (140/223)	71.1 (184/257)	55.6 (179/265)
Alcohol in the Last Month				
Yes	27.1 (52/189)	37.1 (87/223)	22.2 (62/257)	56.1 (163/265)
No	72.9 (137/189)	62.9 (136/223)	77.8 (195/257)	43.9 (102/265)
A Man Should be Tough				
Agree	30.4 (62/189)	72.4 (171/223)	50.7 (145/257)	48.4 (136/265)
Disagree	69.6 (127/189)	27.6 (52/223)	49.3 (112/257)	51.6 (129/265)
Partner Type				
Relationship	82.7 (92/189)	97.6 (98/101)	59.2 (127/257)	73.9 (110/150)
Other	17.3 (16/189)	2.4 (3/101)	40.8 (66/257)	26.1 (40/148)

Bolded cells indicate significantly different values at the 5% level. Tests were conducted with a bivariate regression comparing each variable by gender across site.

Table 6.2: Prevalence of Violence, Mental Health and Sexual Activity Variables, by Gender and Site				
Percentages are weighted; unweighted Ns shown in parentheses. Weighted mean (weighted standard error shown in parentheses)				
Baltimore and Johannesburg Samples, 2013 WAVE Study				
Exposures				
	Baltimore Girls	Johannesburg Girls	Baltimore Boys	Johannesburg Boys
Experiences of Violence				
Fear				
Yes	70.2 (68/189)	80.4 (181/223)	40.6 (114/253)	70.1 (185/265)
No	29.8 (68/189)	19.6 (42/223)	59.4 (114/253)	29.9 (80/265)
Observation				
Yes	59.1 (124/187)	65.0 (143/223)	54.0 (157/254)	73.8 (200/265)
No	40.9 (63/187)	35.0 (80/223)	46.0 (97/254)	26.2 (65/265)
Victimization				
Yes	30.2 (61/189)	45.5 (106/223)	25.6 (77/251)	66.6 (178/264)
No	69.8 (128/189)	54.5 (117/223)	74.4 (174/251)	33.4 (86/264)
Mental Health Confounders				
Depression	37.9 (75/189)	48.3 (98/223)	27.9 (84/257)	48.0 (130/265)
PTSD	38.4 (70/189)	40.4 (94/223)	23.8 (71/257)	31.6 (83/265)
Outcomes				
Sex in the Last 12 Months	54.7 (109/189)	48.7 (103/223)	63.1 (193/257)	57.3 (156/265)
Condom Use at Last Sex	48.8 (48/103)	76.4 (76/101)	53.2 (97/177)	70.6 (108/150)

Bolded cells indicate significantly different values at the 5% level. Tests were conducted with bivariate regression comparing each variable by gender.

**Table 6.3a: Logistic Regression of Fear, Observation and Victimization on Sex in the Last Year with Interactions by Violence and City, adjusting for Depression and PTSD, by Gender
Baltimore and Johannesburg Samples, 2013 WAVE Study**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	odds ratio							
	Females				Males			
Fear	1.4** (1.2 - 1.7)			1.0 (0.9 - 1.2)	0.4*** (0.3 - 0.6)			1.0 (0.9 - 1.2)
Fear X City	0.7 (0.4 - 1.1)				1.2 (0.6 - 2.4)			
Observation		3.2*** (2.6 - 3.8)		2.7*** (2.3 - 3.3)		2.1*** (1.7 - 2.6)		2.4*** (1.8 - 3.2)
Observation X City		0.6*** (0.4 - 0.7)		0.8* (0.7 - 1.0)		0.7 (0.5 - 1.1)		
Victimization			2.9*** (2.2 - 3.7)	2.4*** (1.7 - 3.4)			1.9 (0.8 - 4.5)	1.0 (0.4 - 2.5)
Victimization X City			0.2*** (0.1 - 0.3)	0.2*** (0.1 - 0.3)			0.8 (0.3 - 2.1)	
City	0.7 (0.4 - 1.2)	0.8* (0.6 - 1.0)	1.0 (0.7 - 1.3)	1.1 (0.8 - 1.5)	0.2** (0.1 - 0.5)	0.2*** (0.1 - 0.5)	0.2*** (0.1 - 0.4)	0.5*** (0.4 - 0.6)
Depression	1.0 (0.5 - 1.7)	0.9 (0.6 - 1.5)	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.5)	0.8 (0.3 - 2.1)	0.7 (0.3 - 1.5)	0.7 (0.3 - 1.7)	0.9 (0.6 - 1.4)
PTSD	1.9*** (1.4 - 2.5)	1.8*** (1.3 - 2.5)	1.9*** (1.4 - 2.5)	1.9*** (1.3 - 2.6)	1.5 (0.9 - 2.5)	1.3 (0.7 - 2.1)	1.2 (0.7 - 2.3)	1.8*** (1.3 - 2.5)
Raised by (ref: 2 parents)	0.6*** (0.4 - 0.7)	0.5*** (0.4 - 0.7)	0.5*** (0.4 - 0.7)	0.5** (0.3 - 0.7)	1.2 (0.7 - 2.1)	1.3 (0.8 - 2.2)	1.3 (0.7 - 2.3)	0.5** (0.4 - 0.7)
Adult Female Social Support	0.9 (0.6 - 1.4)	0.9 (0.6 - 1.3)	0.9 (0.6 - 1.4)	1.0 (0.6 - 1.5)	0.9 (0.5 - 1.7)	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.8)	0.9 (0.6 - 1.3)
Adult Male Social Support	1.1 (0.4 - 3.2)	1.2 (0.4 - 3.8)	1.1 (0.3 - 3.5)	1.2 (0.3 - 4.3)	0.9 (0.6 - 1.4)	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.6)	1.2 (0.4 - 3.8)
Age (ref: <17)	3.0** (1.4 - 6.2)	2.9** (1.4 - 6.1)	3.0** (1.5 - 6.0)	3.0** (1.5 - 6.1)	2.8*** (1.8 - 4.2)	2.7*** (1.9 - 3.9)	2.8*** (2.1 - 3.8)	3.0** (1.5 - 5.9)
Drank alcohol last month	2.1** (1.3 - 3.2)	1.9** (1.3 - 2.8)	2.0** (1.3 - 3.2)	1.9** (1.3 - 2.8)	4.3*** (2.2 - 8.4)	3.8*** (1.9 - 7.8)	4.1*** (2.1 - 8.2)	1.9** (1.3 - 2.8)
Believe men should be tough	1.7* (1.1 - 2.5)	1.7** (1.2 - 2.4)	1.6* (1.1 - 2.5)	1.6* (1.1 - 2.5)	0.9 (0.6 - 1.4)	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.7)	1.7* (1.2 - 2.5)
Constant	0.5** (0.3 - 0.8)	0.3*** (0.2 - 0.4)	0.4*** (0.3 - 0.6)	0.2*** (0.2 - 0.3)	2.5* (1.1 - 5.4)	1.1 (0.4 - 2.7)	1.2 (0.4 - 3.2)	0.3** (0.2 - 0.7)
Observations	934	932	934	932	930	931	927	932

95% CI in parentheses

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

**Table 6.3b: Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex with Interactions by Violence and City, adjusting for Depression and PTSD, by Gender
Baltimore and Johannesburg Samples, 2013 WAVE Study**

VARIABLES	(1) odds ratio	(2) odds ratio	(3) odds ratio	(4) odds ratio	(5) odds ratio	(6) odds ratio	(7) odds ratio	(8) odds ratio
	Females				Males			
Fear	0.3** (0.1 - 0.6)			0.3* (0.1 - 0.9)	1.0 (0.7 - 1.5)			1.1 (0.7 - 1.6)
Fear X City	2.2 (0.3 - 18.4)				1.1 (0.5 - 2.5)			
Observation		1.4* (1.0 - 1.9)		0.9 (0.6 - 1.4)		0.5*** (0.3 - 0.7)		0.8 (0.5 - 1.5)
Observation X City		0.3 (0.1 - 1.4)				3.2 (0.7 - 14.9)		
Victimization			1.2 (0.8 - 1.9)	1.2 (0.8 - 1.9)			0.5 (0.3 - 1.1)	0.7 (0.4 - 1.1)
Victimization X City			0.5 (0.2 - 1.4)				1.5 (0.4 - 5.8)	
City	2.1 (0.2 - 19.8)	9.0*** (4.2 - 19.4)	4.8*** (2.5 - 9.1)	4.2** (1.7 - 10.1)	1.7 (0.7 - 4.1)	0.7 (0.1 - 3.8)	1.6 (0.4 - 6.2)	2.0 (0.9 - 4.4)
Depression	0.8 (0.5 - 1.4)	0.8 (0.4 - 1.4)	0.8 (0.4 - 1.4)	0.8 (0.5 - 1.3)	1.0 (0.7 - 1.4)	1.1 (0.7 - 1.7)	1.1 (0.8 - 1.6)	1.1 (0.8 - 1.6)
PTSD	0.9 (0.4 - 1.9)	1.0 (0.5 - 1.8)	1.0 (0.5 - 1.9)	0.9 (0.5 - 1.9)	0.6 (0.3 - 1.0)	0.6 (0.3 - 1.1)	0.6 (0.3 - 1.1)	0.6 (0.3 - 1.1)
Adult Male Social Support	1.8 (0.9 - 3.5)	1.9 (1.0 - 3.6)	1.9 (1.0 - 3.7)	1.9 (0.9 - 3.9)	2.3*** (1.6 - 3.1)	1.9** (1.2 - 2.9)	1.9** (1.2 - 3.0)	1.9** (1.2 - 3.0)
Age (ref: <17)	1.4 (0.7 - 2.9)	1.2 (0.6 - 2.6)	1.3 (0.6 - 2.6)	1.4 (0.7 - 3.0)	1.0 (0.3 - 3.3)	1.0 (0.3 - 3.1)	1.0 (0.3 - 3.0)	0.9 (0.3 - 3.0)
Drank alcohol last month	0.6 (0.3 - 1.2)	0.6 (0.3 - 1.1)	0.5 (0.3 - 1.1)	0.6 (0.3 - 1.1)	0.9 (0.5 - 1.5)	0.8 (0.5 - 1.3)	0.8 (0.5 - 1.3)	0.9 (0.5 - 1.5)
Men should be tough	0.9 (0.5 - 1.7)	0.9 (0.6 - 1.5)	1.0 (0.7 - 1.7)	0.9 (0.5 - 1.7)	0.9 (0.6 - 1.3)	0.9 (0.6 - 1.4)	0.9 (0.6 - 1.2)	0.9 (0.6 - 1.2)
Partner Type	0.3*** (0.2 - 0.6)	0.3*** (0.2 - 0.5)	0.3*** (0.2 - 0.5)	0.3*** (0.2 - 0.5)	0.6 (0.2 - 1.5)	0.6 (0.3 - 1.6)	0.7 (0.3 - 1.6)	0.7 (0.3 - 1.6)
Constant	2.1*** (1.5 - 3.0)	0.7 (0.4 - 1.3)	0.8 (0.5 - 1.3)	1.8 (0.9 - 3.6)	1.4 (0.5 - 3.7)	2.8 (0.7 - 10.6)	1.9 (0.6 - 6.0)	2.0 (0.4 - 9.2)
Observations	726	725	726	725	738	738	736	735

95% CI in parentheses

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

VARIABLES	(1a) Sex in the Last 12 months aOR Baltimore	(1b) Sex in the Last 12 months aOR Jo-burg	(2a) Sex in the Last 12 months aOR Baltimore	(2b) Sex in the Last 12 months aOR Jo-burg	(3a) Sex in the Last 12 months aOR Baltimore	(3b) Sex in the Last 12 months aOR Jo-burg
Fear	1.5** (1.2 - 1.9)	1.0 (0.7 - 1.4)				
Observation			3.8*** (3.2 - 4.5)	1.8*** (1.5 - 2.2)		
Victimization					3.2*** (2.4 - 4.2)	0.5** (0.3 - 0.8)
Depression	1.4 (0.6 - 3.1)	1.0 (0.6 - 1.5)	1.4 (0.9 - 2.2)	0.9 (0.6 - 1.4)	1.4 (0.8 - 2.6)	1.1 (0.7 - 1.6)
PTSD	2.0 (1.0 - 4.3)	1.3 (0.9 - 2.1)	2.2* (1.1 - 4.5)	1.3 (0.8 - 2.0)	2.1* (1.0 - 4.1)	1.4 (0.9 - 2.2)
Raised by (ref: 2 parents)	0.6* (0.5 - 0.9)	0.7 (0.5 - 1.0)	0.5** (0.4 - 0.8)	0.7* (0.5 - 1.0)	0.5** (0.4 - 0.7)	0.7 (0.5 - 1.0)
Ad Female Social Support	0.7 (0.5 - 1.0)	1.0 (0.5 - 2.3)	0.7* (0.5 - 1.0)	1.1 (0.5 - 2.4)	0.8** (0.6 - 0.9)	1.0 (0.4 - 2.4)
Ad Male Social Support	2.5*** (1.8 - 3.6)	0.5 (0.3 - 1.0)	2.8** (1.7 - 4.6)	0.6 (0.3 - 1.1)	2.5*** (1.8 - 3.5)	0.5 (0.2 - 1.0)
Age (ref: <17)	2.4** (1.5 - 4.1)	5.8*** (3.1 - 10.7)	2.4** (1.6 - 3.5)	6.2*** (3.2 - 11.8)	2.6** (1.6 - 4.1)	5.6*** (3.0 - 10.5)
Drank alcohol last month	1.5* (1.0 - 2.0)	3.1*** (1.8 - 5.4)	1.3 (0.9 - 1.9)	2.9** (1.7 - 4.9)	1.4* (1.0 - 2.1)	3.2*** (1.8 - 5.6)
Men should be tough	1.6 (0.8 - 3.2)	1.9* (1.1 - 3.5)	1.6 (0.9 - 2.6)	2.0* (1.1 - 3.8)	1.5 (0.8 - 2.8)	1.9* (1.0 - 3.6)
Constant	0.3** (0.2 - 0.5)	0.2** (0.1 - 0.5)	0.2*** (0.1 - 0.3)	0.1*** (0.1 - 0.3)	0.3*** (0.2 - 0.5)	0.3** (0.1 - 0.6)
Observations	189	223	187	223	189	223

Highlights in Blue indicate statistically significant ORS>1 and highlights in Yellow indicate statistically significant ORS<1

95% in parentheses

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

Table 6.4b: Logistic Regression of Fear, Observation or Victimization on Sex in the Last 12 Months (Boys) Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	(1a) Sex in the Last 12 months aOR Baltimore	(1b) Sex in the Last 12 months aOR Jo-burg	(2a) Sex in the Last 12 months aOR Baltimore	(2b) Sex in the Last 12 months aOR Jo-burg	(3a) Sex in the Last 12 months aOR Baltimore	(3b) Sex in the Last 12 months aOR Jo-burg
Fear	0.4** (0.2 - 0.7)	0.4* (0.2 - 0.9)				
Observation			2.6** (1.7 - 3.8)	1.3 (0.7 - 2.3)		
Victimization					2.1 (0.6 - 6.6)	1.5 (0.6 - 3.7)
Depression	1.6 (0.3 - 7.6)	0.5 (0.2 - 1.6)	1.0 (0.3 - 3.3)	0.5 (0.2 - 1.5)	1.1 (0.3 - 3.6)	0.5 (0.1 - 1.7)
PTSD	1.0 (0.4 - 2.4)	2.0** (1.3 - 3.0)	0.8 (0.5 - 1.2)	1.8* (1.1 - 2.9)	0.7 (0.3 - 1.8)	1.8* (1.1 - 3.0)
Raised by (ref: 2 parents)	1.4 (0.7 - 2.9)	1.2 (0.5 - 3.1)	1.8* (1.1 - 3.1)	1.3 (0.5 - 3.2)	1.8 (0.9 - 3.4)	1.3 (0.5 - 3.2)
Ad Female Social Support	0.9 (0.1 - 7.3)	0.8 (0.4 - 1.6)	0.7 (0.1 - 5.5)	0.9 (0.5 - 1.8)	0.9 (0.1 - 8.8)	0.9 (0.5 - 1.8)
Ad Male Social Support	0.9 (0.3 - 2.7)	0.9 (0.5 - 1.8)	1.4 (0.4 - 4.3)	0.8 (0.4 - 1.8)	1.3 (0.4 - 3.9)	0.8 (0.3 - 1.9)
Age (ref: <17)	1.9** (1.3 - 2.7)	4.5*** (3.0 - 6.7)	1.8* (1.1 - 2.9)	4.4*** (3.0 - 6.6)	2.0** (1.4 - 2.9)	4.4*** (2.8 - 6.8)
Drank alcohol last month	1.1* (1.0 - 1.3)	7.4*** (5.8 - 9.6)	1.1 (0.8 - 1.4)	6.6*** (5.1 - 8.6)	1.3** (1.1 - 1.5)	6.7*** (4.9 - 9.1)
Men should be tough	1.1 (0.6 - 2.1)	0.8 (0.3 - 1.8)	1.2 (0.6 - 2.4)	0.8 (0.3 - 2.3)	1.3 (0.7 - 2.6)	0.8 (0.2 - 2.5)
Constant	2.5 (0.2 - 36.0)	0.3* (0.2 - 0.7)	0.9 (0.0 - 20.4)	0.2** (0.1 - 0.4)	0.9 (0.0 - 19.0)	0.2** (0.1 - 0.4)
Observations	253	265	254	265	251	264

Highlights in Blue indicate statistically significant ORs>1 and highlights in Yellow indicate statistically significant ORs<1

95% in parentheses

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

Table 6.5a: Logistic Regression of Fear, Observation or Victimization on Condom Use at Last Sex (Girls)						
Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	(1a) Condom Use Last Sex aOR Baltimore	(1b) Condom Use Last Sex aOR Jo-burg	(2a) Condom Use Last Sex aOR Baltimore	(2b) Condom Use Last Sex aOR Jo-burg	(3a) Condom Use Last Sex aOR Baltimore	(3b) Condom Use Last Sex aOR Jo-burg
Fear	0.3* (0.1 - 1.0)	0.8 (0.0 - 15.8)				
Observation			1.4 (1.0 - 2.0)	0.3 (0.1 - 1.3)		
Victimization					1.1 (0.7 - 1.9)	0.6 (0.3 - 1.6)
Depression	1.4 (0.5 - 3.5)	0.3 (0.1 - 1.7)	1.4 (0.6 - 3.0)	0.4* (0.1 - 1.0)	1.3 (0.6 - 2.7)	0.3 (0.1 - 1.3)
PTSD	0.4** (0.2 - 0.6)	1.9 (0.6 - 5.7)	0.4** (0.2 - 0.7)	1.9 (0.6 - 6.4)	0.4** (0.2 - 0.7)	1.9 (0.5 - 7.0)
Raised by (ref: 2 parents)	1.6 (0.9 - 2.8)	0.7 (0.1 - 5.7)	1.8** (1.3 - 2.4)	0.7 (0.2 - 3.7)	1.9** (1.4 - 2.6)	0.7 (0.1 - 4.9)
Adult Male Social Support	3.9** (2.3 - 6.8)	1.6 (0.6 - 4.1)	4.5*** (2.6 - 7.8)	1.6 (0.7 - 3.6)	4.8*** (3.1 - 7.4)	1.5 (0.5 - 4.5)
Age (ref: <17)	0.7* (0.5 - 0.9)	2.8 (0.8 - 9.6)	0.6** (0.4 - 0.8)	3.2* (1.2 - 9.1)	0.6** (0.4 - 0.7)	2.6 (0.8 - 8.6)
Drank alcohol last month	0.9 (0.3 - 2.7)	0.3* (0.1 - 0.9)	0.8 (0.4 - 1.8)	0.3* (0.1 - 0.8)	0.8 (0.3 - 2.0)	0.3* (0.1 - 0.9)
Men should be tough	0.8 (0.3 - 1.7)	1.4 (0.6 - 3.2)	0.9 (0.5 - 1.7)	1.3 (0.5 - 3.1)	1.0 (0.5 - 2.0)	1.3 (0.4 - 4.5)
Partner Type	0.4** (0.2 - 0.6)	0.3* (0.1 - 0.6)	0.3** (0.2 - 0.5)	0.3* (0.1 - 0.8)	0.3** (0.2 - 0.5)	0.3* (0.1 - 0.8)
Constant	1.6 (0.8 - 3.2)	4.2 (0.6 - 30.0)	0.5 (0.2 - 1.1)	7.1* (1.5 - 32.6)	0.5* (0.3 - 0.8)	4.5* (1.2 - 16.5)
Observations	103	100	102	100	103	100

Highlights in Blue indicate statistically significant ORS>1 and highlights in Yellow indicate statistically significant ORS<1

95% in parentheses

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

Table 6.5b: Logistic Regression of Fear, Observation or Victimization on Condom Use at Last Sex (Boys)						
Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	(1a) Condom Use Last Sex aOR Baltimore	(1b) Condom Use Last Sex aOR Jo-burg	(2a) Condom Use Last Sex aOR Baltimore	(2b) Condom Use Last Sex aOR Jo-burg	(3a) Condom Use Last Sex aOR Baltimore	(3b) Condom Use Last Sex aOR Jo-burg
Fear	1.1 (0.5 - 2.5)	1.1 (0.4 - 2.9)				
Observation			0.4* (0.2 - 0.8)	2.0 (0.3 - 11.5)		
Victimization					0.4 (0.2 - 1.1)	0.9 (0.3 - 3.4)
Depression	1.0 (0.5 - 2.3)	1.1 (0.7 - 1.8)	1.4 (0.6 - 3.4)	1.2 (0.7 - 2.0)	1.4 (0.8 - 2.5)	1.2 (0.8 - 1.8)
PTSD	0.6 (0.2 - 1.8)	0.4* (0.2 - 0.9)	0.6 (0.2 - 2.3)	0.4* (0.2 - 0.9)	0.8 (0.2 - 2.5)	0.5* (0.2 - 1.0)
Raised by (ref: 2 parents)	3.9** (2.1 - 7.2)	1.2 (0.8 - 1.9)	2.7* (1.2 - 6.5)	1.3 (0.9 - 2.0)	2.9* (1.1 - 7.8)	1.2 (0.8 - 1.8)
Adult Male Social Support	3.4*** (2.6 - 4.6)	2.7* (1.2 - 6.0)	2.5* (1.4 - 4.5)	2.5* (1.3 - 4.9)	2.4** (1.6 - 3.6)	2.8* (1.0 - 7.7)
Age (ref: <17)	0.4** (0.2 - 0.6)	3.5* (1.2 - 9.7)	0.4** (0.2 - 0.7)	3.4* (1.4 - 8.4)	0.4*** (0.3 - 0.6)	3.6* (1.2 - 10.4)
Drank alcohol last month	0.9 (0.5 - 1.8)	0.8 (0.2 - 3.0)	0.9 (0.5 - 1.9)	0.6 (0.3 - 1.5)	0.8 (0.5 - 1.6)	0.8 (0.3 - 2.4)
Men should be tough	0.9 (0.4 - 1.7)	0.8 (0.5 - 1.2)	0.9 (0.5 - 1.7)	0.9 (0.5 - 1.5)	0.8 (0.4 - 1.4)	0.8 (0.5 - 1.3)
Partner Type	0.3* (0.1 - 0.9)	1.1 (0.6 - 2.0)	0.3 (0.1 - 1.1)	1.2 (0.6 - 2.2)	0.3* (0.1 - 0.8)	1.2 (0.7 - 2.0)
Constant	0.9 (0.2 - 4.1)	0.7 (0.0 - 13.1)	2.1 (0.2 - 23.4)	0.5 (0.0 - 13.3)	1.7 (0.3 - 9.5)	0.7 (0.0 - 22.4)
Observations	176	148	176	148	175	147

Highlights in Blue indicate statistically significant ORS>1 and highlights in Yellow indicate statistically significant ORS<1

95% in parentheses

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

Figure 6.2a: Logistic Regression of Fear, Observation and Victimization (combined) on Sex in the Last 12 Months (Girls) Baltimore and Johannesburg Samples, 2013 WAVE Study

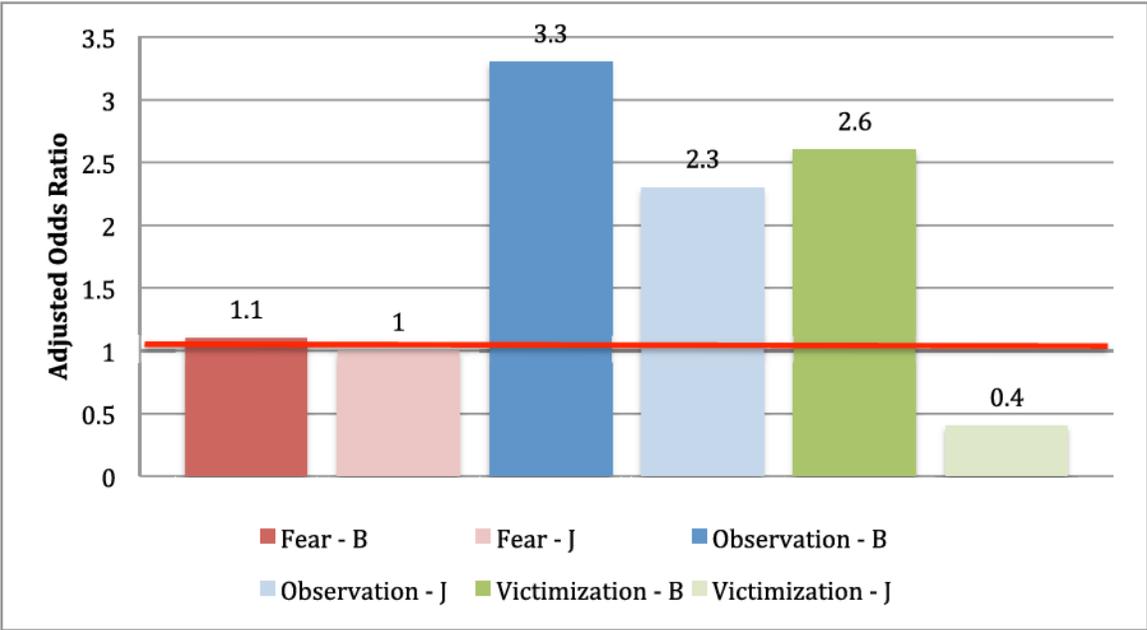
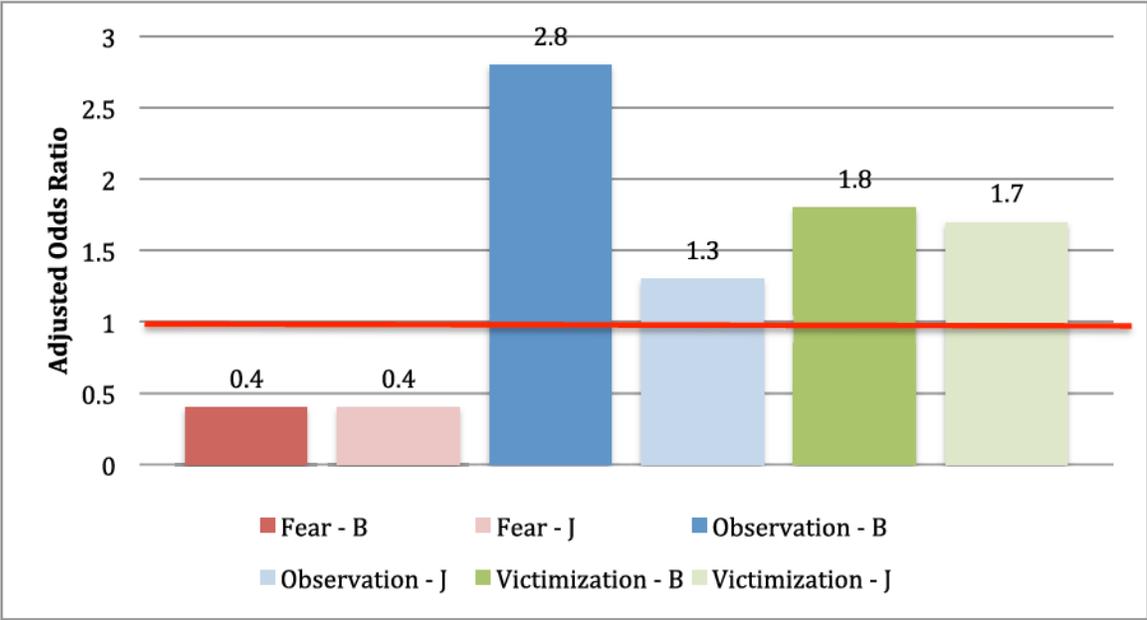
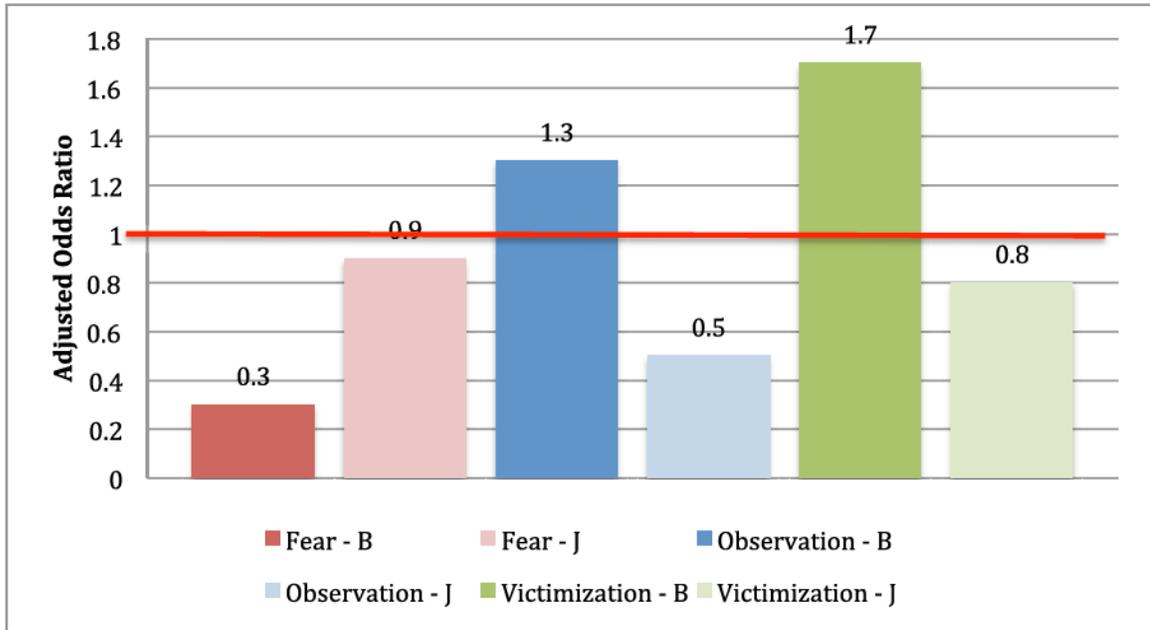


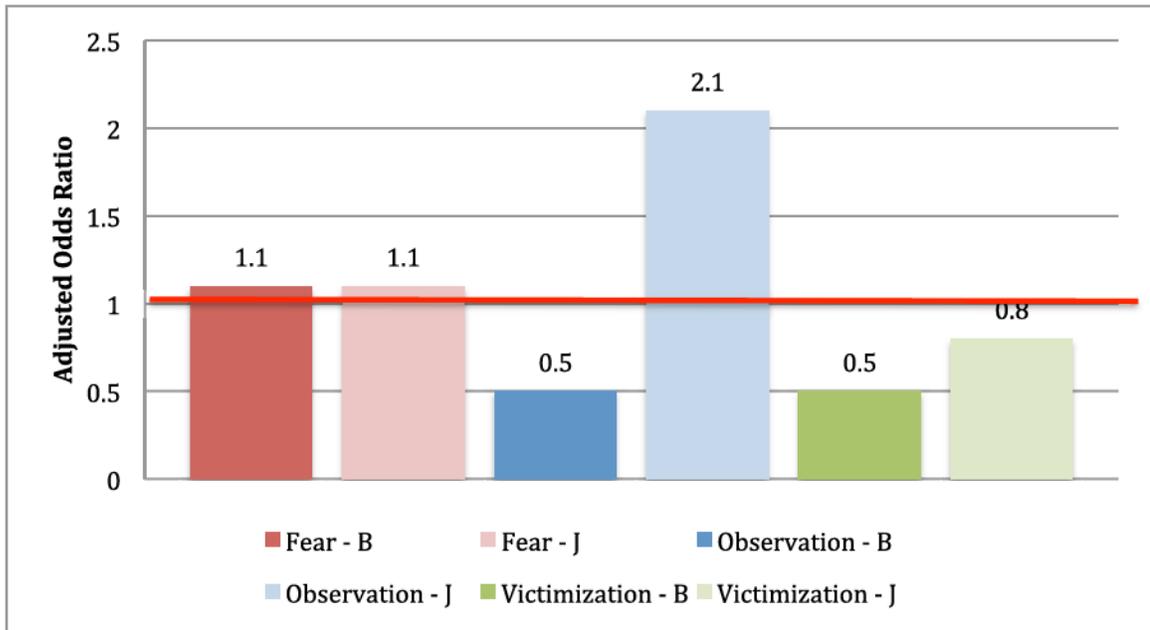
Figure 6.2b: Logistic Regression of Fear, Observation and Victimization (combined) on Sex in the Last 12 Months (Boys) Baltimore and Johannesburg Samples, 2013 WAVE Study



**Figure 6.3a: Logistic Regression of Fear, Observation and Victimization (combined) on Condom Use at Last Sex (Girls)
Baltimore and Johannesburg Samples, 2013 WAVE Study**



**Figure 6.3b: Logistic Regression of Fear, Observation and Victimization (combined) on Condom Use at Last Sex (Boys)
Baltimore and Johannesburg Samples, 2013 WAVE Study**



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Chapter 7: Conclusion

Summary of Findings

This dissertation was constructed around three specific aims. The first aim was to explore the relationship between community violence and sexual behaviors amongst a sample of adolescents in low-income sections of East Baltimore. The second aim was to test whether mental health confounded the relationships between violence and sexual behaviors. Finally, the third aim was to explore whether the associations between community violence and sexual behaviors were similar in two different settings, Johannesburg and Baltimore.

I argued that we would not expect to see strong associations between violence and sexual activity because sexual activity is a normative behavior among adolescents, and a necessary step in the transition to healthy adult relationships. Thus, though some sexual activity may be risky – coerced or unprotected– positive, healthy sexual experiences would coexist with these negative experience and we would see null effects. Second, I expected negative associations between violence and condom use because violence would be associated with increased risk-taking. I further expected that the association would be partly explained by depression and PTSD. Third, I hypothesized that these associations would be similar in Baltimore and Johannesburg as there were common underlying psychological processes as well as increasingly similar global norms shaping sexual behaviors for adolescents living in poor, urban settings. Throughout the three aims, I also hypothesized that the associations between violence and sexual behaviors would differ by gender because girls and boys experiences of violence and engagement in sexual activity differ.

While the results reveal associations between violence and sexual activity, these relationships were complicated and demand nuanced explanations. The associations between violence and condom use were less consistent than anticipated. In addition, there was very little evidence to suggest that either depression or PTSD confounded the relationships between violence and sexual behaviors, despite mental health being associated with sexual behaviors. Though I expected there to be differences between males and females, I primarily anticipated this to be in terms of strength of associations rather than direction of effect; however, I found important differences that included the potential for very different underlying mechanisms by gender. Finally, there were important differences by site that suggest that contextual realities drive some of the associations. Altogether, these results suggest that the associations between perceptions of community violence and sexual behaviors depend on type of violence exposure, are sex specific, and can differ across sites.

In order to better understand both the results and how they differed from my hypotheses, there are six important themes that I will discuss below: age, the type of partnerships, mental health, site and gender, and differences in the perceptions of types of violence. In the coming section, I will interpret these patterns, address some of the broader strengths and limitations, and conclude with implications for policy and future research.

Age

The age range for which respondents were eligible to participate in the WAVE Study included the ages when many young people typically begin to become sexually active.

There may be patterns that go against my hypotheses because sexual activity may differ in how enjoyable, fun, coerced, pressured, upsetting, or confusing it might be across this age range. Understanding differences in how sex is experienced at age 15 or at age 19, for example, may help us better understand the results. At age 15, young people are beginning to sexually explore and may be less likely to be in longer, committed partnerships; while, by age 19, people are more sexually experienced and may engage in more committed relationships that either last longer, lead to longer commitments, or lead to emotional break-ups.¹

In both sites, younger respondents were less likely to have engaged in sexual activity in the last year. The percentage of sexually active adolescents increased with age: 26% of respondents in Johannesburg and 60% of respondents in Baltimore were sexually experienced at 15 years of age while 75% in Johannesburg and 84% in Baltimore were sexually experienced at age 19. Though age was adjusted for in these models, understanding how duration of sexual experience and normative experiences of sexual activity change the way violence affects sexual behaviors may be an important component of understanding whether sexual activity is risky or not. Unfortunately, in these analyses, age was not distributed normally and the numbers of respondents were low in some of the categories so that a binary categorization was most appropriate. Exploring how age is associated with sexual satisfaction and type of partnership is an important next step.

Another reason that age is an important factor is that there is a difference between chronological age and developmental age during adolescence.² Some young people are physically mature before they are emotionally mature and vice versa. Thus, while

transitioning to being sexually active is normative during adolescence, developmental as well as chronological age both shape the timing of the event. Negative sexual experiences may be associated with discrepancies between these two measures; for example, younger girls who look older than they are may be pressured to engage in sexual activity before they are emotionally ready. However, this literature is scarce due to lack of measures on the developmental age of young people in health surveys. Therefore we know little about the relationship between developmental age and sexual well-being. Young people who are younger developmentally may have a harder time processing experiences of violence and may engage in sexual activity that is not developmentally age appropriate. Introducing a developmental perspective to the study of sexual health related outcomes might give us a more comprehensive understanding of whether violence predicts poor sexual health outcomes for certain youth more than others in poor urban settings.

Partnership Health

The fact that young people's partnerships³ in many of these low-income neighborhoods are characterized by instability and fragility^{4,5} suggests a need to further explore whether these weaker relationships are associated with experiences of violence. In the context of this research, more information about relationship formation and partnership types among urban poor adolescents and their connection to risky behaviors may illuminate some of the results shown here.

The association between violence and sexual activity is hard to interpret in the absence of information regarding adolescents' experiences of sex, whether positive or negative. A next step would be to test the hypothesis that violence is associated with

more negative and unhealthy sexual activity. Understanding both the positive and negative experiences of sexual activity and the determinants of negative behaviors would be important moving forward.

One way to explore this is to understand contextually the contribution of partnership types in the associations described in this dissertation. In Bronfenbrenner's typology, partners would be situated at the micro-level – the immediate contextual environment – that informs health and development. Yet our measures are often too simplistic. Differentiating between casual versus constituted relationship does not provide insight into whether that partnership is positive, healthy, or supportive. Moving forward, more insights on partner characteristics and the context of the relationship including questions about safety, trust, satisfaction, length, monogamy, and communication would improve our understanding of sexual experiences among adolescents.

Reasons for limited information on partnerships can likely be explained in two ways. First, the fact that partner research has a number of methodological complications. For example, it is hard to track multiple partners, measure the emotional complexities of how someone feels about a partner, or capture accurate information about the partner's perspective on the relationship in the absence of data collected from the partner. Second, the dominant norm in US adolescent research on sexual behavior is on delaying age at sexual debut. Researchers in adolescent health often focus solely on messages about delaying the age of sexual initiation, especially in the US, or about consistent condom use, but fail to explore the positive youth development components of engaging in healthy sexual activity. Our existing messages may not equip young people with the skills to engage in healthy relationships that are safer and emotionally satisfying. Understanding

whether violence affects how young people navigate those choices may help us understand where to intervene in order to keep young people safer – both from violence and poor sexual health outcomes. Thus the complex findings of this dissertation demand a refinement of the original hypotheses and an exploration into how to capture positive and negative sexual behavior within the context of partnerships.

PTSD and Depression

Research has shown that violence affects mental health and that mental health is associated with a lack of preventive sexual behaviors, including condom use, use of contraception, and consistency of contraceptive use. Following this literature, I hypothesized that mental health would confound the association between violence and sexual behaviors. However, results showed little evidence of such a process.

In the cross-sectional data, only testing for confounding was possible. PTSD and depression were both associated with violence in the bivariate analyses. In the multivariate analyses, there were also associations between mental health and sexual behaviors for females. However, mental health did not confound the relationships between violence and sexual behavior.

This may be because violence relates to sexual behavior through other mechanisms, in particular through cognitive well-being, including self-efficacy, self-reflection and impulse control. Building on the above discussion about partnerships, a potential line of exploration would be to explore whether young people who experience violence also struggle to create satisfying partnerships because of low self-efficacy, agency, impulsiveness, or self-reflectiveness.

Site and Gender

Site and gender were two of the structural contextual factors I aimed to explore. Though there were important differences across the two sites, two interesting similarities emerged. First, associations between violence and sexual activity were more similar than between violence and condom use; however, even though there were differences in the patterns of condom use they were not statistically significant differences. Second, results for boys were more similar than for girls. The similarity in the association between violence and sexual activity across sites supports my original hypothesis of a normative transition into sexual activity during adolescence globally. Conversely, condom use is more likely determined by contextual factors. A glaring contextual difference between the two sites is the HIV epidemic in sub-Saharan Africa. This drives differences in levels but it also could drive differences in acceptance and norms so that even after violence, behaviors differ. It may suggest success in the public health messaging around condom use in South Africa. Similar inconsistencies in the associations between violence and sexual activity in the last year across sites also suggests that in both places understanding more about partnerships will help us understand the positive and negative consequences of sexual activity.

One important difference in the two sites was how victimization and sexual activity were associated for girls. In Baltimore girls who were victimized were more likely to have engaged in sexual activity – while in Johannesburg the opposite was true. This could suggest that girls experience different types of victimization in the two cities. Specifically, more information about the perpetrators, frequency, and kind of victimization would be important to collect. In particular, experiences of sexual violence

are more common in Johannesburg than in Baltimore and being victimized sexually may affect how often or willingly young women in Johannesburg engage in sexual activity. In this analysis, including measures of sexual violence in the regressions lead to instability of the models and thus they were not included in either site.

Simultaneously, these results might suggest that girls' behaviors are more contextually shaped than boys' behaviors. Whether this means that global norms more strongly influence our understandings of masculinity and what are appropriate male sexual behaviors while local norms more often shape female behaviors and sexual norms is an interesting question that calls for more cross-cultural comparisons.

Measures of Violence

These analyses further our understanding of both how different experiences of violence are associated with different behaviors and also suggest that violence permeates communities beyond the victims themselves. Fear, which can result both from observation of violence or victimization as well as from community narratives, is a different kind of experience than observation or victimization. While they are, in theory, countable events, fear is entirely perceived by the respondent and it is associated with a number of sexual outcomes here. Expanding our understanding of how violence exposures are associated with health processes beyond victimization is an important contribution to urban health research. Another important contribution to this literature is the differences in levels of fear for boys and girls and how these experiences of fear differ in their associations – not only in magnitude but also in direction.

Strengths

There are a number of strengths to these analyses. First, I have three different measures to understand exposures of violence. Most studies about violence explore the effects of only one type of violence exposure.

Second, along with multiple violence measures, I consider processes through which violence affects sexual behaviors. Specifically, I use two measures of mental health, in the form of depression and PTSD in order to understand more about different potential effects of mental health sequelae. Though there was little evidence to suggest that depression or PTSD acted as confounders in this study, we found that PTSD was more often associated with sexual behaviors than depression.

Third, being able to compare two sites – Baltimore and Johannesburg – allows an exploration of whether there is a common psychological process linking violence and sexual behaviors or whether this process differs across sites, pointing to the importance of contextual factors.

Fourth, unlike the AddHealth results⁶ that explore the effects of violence on a representative sample of US adolescents, these analyses focus specifically on two populations of young people who are most likely to experience violence. This means that we can explore the specific mechanisms that potentially drive the association between violence and sexual behaviors among adolescents in poor urban poor settings, who are poorly represented in national surveys.

Finally, testing two different sexual health outcomes – one that is related to negative sexual outcomes (lack of condom use) and a second that is not specifically

related to risk (sexual activity) – allowed me to explore differences in the association of violence with sexual behaviors that are more or less risky. A priori I theorized that using sexual activity, as a measure of adolescent risk, may be too simplistic as some sexual activity is healthy and developmentally important. However, the relationships I saw between violence and sexual activity calls for a better understanding of the contexts in which sexual activity occurs.

Limitations

There are a number of limitations to these analyses. First, the cross-sectional nature of the data means that any determination of causality is not possible. The results only shed light on associations but do not indicate if experiences of violence *cause* differences in sexual behaviors. Capturing the sequential timing of violence experiences may help us better understand the subsequent effects on sexual behaviors.

Second little research has focused on adolescent sexual satisfaction or partnership quality. Few studies explore sexual pleasure, emotional intimacy, or overall well-being related to adolescent partnership. We did not have measures to explore either avenue. My work suggests that measures of sexual activity alone are not sufficient to evaluate sexual health following violence exposure.

Third, the use of respondent-driven sampling assumes that when the RDS sample has reached saturation, it provides a representative sample of the underlying population. However, in one respect, we know that the sample was not representative: gender. In both Baltimore and Johannesburg, boys were more likely to be included than girls. This suggests that there may be other measures for which the generalizability to the broader

populations may not apply. The rates of depression are similar in this sample to other Baltimore samples⁷ but the rates of condom use are higher.⁸ In Johannesburg, depression is more common in this sample than in other reported samples but they were more broadly representative of the population of South Africa.⁹ Thus, the representativeness of the sample should be explored further before these findings are applied to these settings.

Fourth, because these analyses are from two very specific populations of low-income adolescents, the results are not generalizable to all adolescent populations.

Finally, measures of violence do not differentiate between chronic or acute experiences. There are young people who have only witnessed or been victimized rarely while there are others who likely have experienced violence on a regular basis. We also did not measure experiences prior to the last year while many young people may have experienced violence much earlier in their lives, or be chronically exposed. These young people might still have been categorized as “observers” or “victimized” but further exploration into dose responses or the differences between chronic and acute exposure may be necessary.

Implications

Research

In the future, researchers need to consider several specific components of these results. First, research should take on a more holistic view of adolescent sexual health, considering the positive and negative attributes of sexual activity within adolescent relationships. Exploring whether their intentions and actions match may help us better understand where to intervene. Second, beyond different forms of violence perceptions –

fear, observation and victimization – concepts of timing, frequency, and emotional responses should be considered in the future. Finally, these results suggest that some associations between violence and sexual behaviors may be similar even in contexts that are very different. Further explorations of how poor, marginalized young people around the world experience violence is important for us to better understand what the common psychological underpinnings are and what responses are contextually driven.

Policy

There are a number of implications for policy. First, for providers this work sheds light on the fact that victimization is not the only type of violence exposure that we must screen for. Making sure that we ask whether young people have seen violence or are scared of violence may allow us to more effectively reach young people who have been affected by it. Second, from a policy perspective it is unclear whether reducing violence will have a clear impact on adolescent sexual health. More information on adolescent positive and negative sexual experiences is needed to identify the drivers of negative sexual health outcomes. In addition, these results suggest that some experiences of violence may be associated with condom use. Exploring ways from a policy perspective to help young people engage in safe sex after experiences of violence is of utmost importance.

Conclusion

Violence is a common experience for young people in urban poor settings in Baltimore and Johannesburg. Working on violence prevention programs is essential. Though these

results do not suggest in a clear or linear fashion that reducing violence will reduce poor sexual health outcomes, exploring the more nuanced aspects of adolescent sexual satisfaction, relationship development, and partner communication may help explain some of the complexities of these findings. Engaging young people in conversations about the violence they experienced and providing spaces to cope is essential. How they view relationships may be related to their violence exposure more than I was able to explore in this dissertation.

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Appendices

Regressions of Observation and Victimization on Fear

Logistic Regression of Observation and Victimization on Fear (Females)						
Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	Baltimore Females			Johannesburg Females		
	(1) aOR Fear	(2) aOR Fear	(3) aOR Fear	(4) aOR Fear	(5) aOR Fear	(6) aOR Fear
Observation	2.3** (1.5 - 3.7)		1.9* (1.1 - 3.3)	2.9*** (1.8 - 4.8)		2.4** (1.5 - 4.0)
Victimization		3.0** (1.5 - 5.8)	2.4* (1.2 - 4.7)		3.3*** (1.9 - 5.8)	2.8** (1.7 - 4.9)
Raised (ref: 2 parents)	0.8 (0.3 - 2.2)	0.7 (0.4 - 1.5)	0.8 (0.3 - 2.1)	2.7* (1.2 - 6.1)	2.6** (1.3 - 4.9)	2.7* (1.2 - 6.2)
Female Social Support	0.0*** (0.0 - 0.0)	0.1 (0.0 - 1.6)	0.0*** (0.0 - 0.0)	0.2 (0.0 - 1.4)	0.2 (0.0 - 1.1)	0.2 (0.0 - 1.1)
Male Social Support	0.3** (0.2 - 0.6)	0.3** (0.2 - 0.6)	0.3** (0.2 - 0.7)	0.8 (0.4 - 1.6)	0.7 (0.3 - 1.5)	0.8 (0.4 - 1.6)
Age (ref: <17)	0.9 (0.5 - 1.7)	0.8 (0.6 - 1.2)	0.9 (0.5 - 1.8)	0.6 (0.3 - 1.2)	0.7 (0.4 - 1.2)	0.7 (0.4 - 1.3)
Alcohol last month	0.7* (0.5 - 1.0)	0.9 (0.7 - 1.1)	0.7* (0.5 - 0.9)	1.5 (0.8 - 2.9)	2.1** (1.2 - 3.5)	1.8* (1.1 - 3.2)
Men should be tough	1.2 (0.6 - 2.2)	1.1 (0.5 - 2.4)	1.2 (0.7 - 2.2)	0.7 (0.4 - 1.5)	0.7 (0.4 - 1.4)	0.8 (0.4 - 1.6)
Constant	351.7*** (185.5 - 666.8)	44.7* (2.2 - 922.7)	269.1*** (151.3 - 478.4)	11.2* (1.4 - 88.8)	12.2* (1.9 - 80.9)	6.9* (1.5 - 32.4)
Observations	444	446	444	488	488	488

95% CI in parentheses
 *** p<0.001, ** p<0.01, * p<0.05

Logistic Regression of Observation and Victimization on Fear (Males)						
Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	Baltimore Males			Johannesburg Males		
	(1)	(2)	(3)	(4)	(5)	(6)
	aOR Fear	aOR Fear	aOR Fear	aOR Fear	aOR Fear	aOR Fear
Observation	2.1 (0.9 - 5.1)		1.6 (0.6 - 4.4)	2.7 (0.9 - 8.5)		2.1 (0.8 - 5.5)
Victimization		2.6*** (1.9 - 3.5)	2.2** (1.4 - 3.2)		2.4* (1.0 - 5.6)	1.8* (1.1 - 3.1)
Raised (ref: 2 parents)	0.6* (0.4 - 1.0)	0.6 (0.3 - 1.1)	0.6 (0.4 - 1.0)	1.0 (0.7 - 1.5)	0.9 (0.6 - 1.4)	1.0 (0.7 - 1.4)
Female Social Support	1.0 (0.5 - 1.9)	1.0 (0.5 - 2.1)	1.0 (0.4 - 2.1)	0.6 (0.4 - 1.0)	0.7 (0.4 - 1.1)	0.7 (0.4 - 1.1)
Male Social Support	0.5 (0.1 - 1.6)	0.5 (0.2 - 1.7)	0.5 (0.2 - 1.7)	1.4 (0.8 - 2.5)	1.5 (0.8 - 2.7)	1.4 (0.8 - 2.6)
Age (ref: <17)	1.0 (0.7 - 1.4)	1.1 (0.8 - 1.4)	1.0 (0.7 - 1.5)	0.8 (0.2 - 2.8)	0.8 (0.3 - 2.7)	0.8 (0.3 - 2.7)
Alcohol last month	0.7 (0.3 - 2.1)	0.8 (0.3 - 2.1)	0.7 (0.2 - 2.1)	0.9 (0.5 - 1.6)	1.0 (0.6 - 1.8)	0.9 (0.5 - 1.5)
Men should be tough	0.6 (0.3 - 1.2)	0.6 (0.4 - 1.0)	0.6 (0.3 - 1.1)	1.0 (0.6 - 1.9)	1.1 (0.6 - 2.0)	1.1 (0.6 - 1.9)
Constant	1.5 (0.3 - 7.1)	1.6 (0.2 - 11.4)	1.5 (0.3 - 8.1)	1.6 (0.9 - 2.9)	1.7 (0.9 - 3.1)	1.3 (0.7 - 2.4)
Observations	440	439	439	488	487	487

95% CI in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Cross-Tabulations in Johannesburg that are similar to Paper 1

Prevalence of All Covariates by Each Violence Variable (Females) Percentages are weighted; unweighted Ns shown in parentheses. Weighted mean (weighted standard error shown in parentheses) Johannesburg Sample, 2013 WAVE Study			
Demographic Variable	Fear (% , n/N) N=223	Observation (% , n/N) N=223	Victimization (% , n/N) N=223
Age Group			
15-16	87.4 (46/53)	71.8 (38/53)	56.2 (31/53)
17-19	78.0 (135/170)	62.7 (105/170)	41.7 (75/170)
Raised			
2 Parents	70.6 (58/81)	63.9 (48/81)	40.1 (31/81)
Other	87.0 (123/142)	65.8 (95/142)	48.6 (75/142)
Females Adult Social Support			
Low	96.0 (38/42)	75.1 (29/42)	50.6 (24/42)
High	76.6 (143/181)	62.6 (114/181)	44.2 (82/181)
Male Adult Social Support			
Low	85.7 (70/83)	72.9 (61/83)	48.3 (45/83)
High	77.2 (111/140)	60.1 (82/140)	43.7 (61/140)
Alcohol (last month)			
No	77.8 (108/136)	58.5 (81/136)	45.7 (61/136)
Yes	85.0 (73/87)	76.1 (62/87)	45.1 (45/87)
Tough Man			
Disagree	81.1 (138/169)	66.2 (107/169)	45.9 (83/169)
Agree	78.8 (43/54)	62.2 (36/54)	44.1 (23/54)
Partner Type			
Relationship	79.2 (77/99)	71.9 (67/99)	37.5 (39/99)
Non-relationship	100 (4/4)	68.8 (3/4)	37.5 (2/4)

Prevalence of All Covariates by Each Violence Variable (Males) Percentages are weighted; unweighted Ns shown in parentheses. Weighted mean (weighted standard error shown in parentheses) Johannesburg Sample, 2013 WAVE Study			
Demographic Variable	Fear (% , n/N) N=265	Observation (% , n/N) N=265	Victimization (% , n/N) N=264
Age Group			
15-16	72.5 (45/69)	71.0 (47/69)	63.1 (45/69)
17-19	69.0 (140/196)	75.2 (153/196)	68.2 (122/195)
Raised			
2 Parents	71.0 (56/82)	80.4 (61/82)	71.4 (52/81)
Other	69.7 (129/183)	71.2 (139/183)	64.7 (126/183)
Females Adult Social Support			
Low	73.1 (39/56)	68.6 (43/56)	65.6 (38/56)
High	69.2 (146/209)	75.3 (157/209)	66.9 (140/208)
Male Adult Social Support			
Low	66.8 (61/86)	72.4 (67/86)	68.0 (60/86)
High	71.8 (124/179)	74.6 (133/179)	65.8 (118/178)
Alcohol (last month)			
No	69.3 (69/102)	60.1 (61/102)	58.1 (62/102)
Yes	70.7 (116/163)	84.6 (139/163)	73.3 (116/162)
Tough Man			
Disagree	70.1 (98/136)	78.0 (106/136)	71.1 (97/136)
Agree	70.1 (87/129)	70.0 (94/129)	62.3 (81/128)
Partner Type			
Relationship	65.6 (79/111)	82.4 (93/111)	69.4 (78/111)
Non-relationship	60.9 (27/45)	75.4 (36/45)	79.8 (35/44)

Prevalence of Sex in Last 12 Months and Cross-tabulation of Sex in the Last 12 Months by all Covariates, by gender Johannesburg Sample, 2013 WAVE Study		
Variable	Females	Males
	Sex in last 12 months (N=223)	Sex in last 12 months (N=265)
Total	48.7 (103/223)	54.2 (156/265)
Age Group		
15-16	24.0 (14/53)	31.8 (28/69)
17-19	57.4 (89/170)	64.5 (128/196)
Raised		
2 Parents	54.2 (41/81)	52.7 (44/82)
Other	45.1 (62/142)	54.8 (112/183)
Female Adult Social Support Scale		
Low	49.3 (18/42)	57.3 (33/56)
High	48.6 (85/181)	53.3 (123/209)
Male Adult Social Support Scale		
Low	58.7 (42/83)	61.9 (60/86)
High	42.4 (61/140)	50.1 (96/179)
Alcohol Last Month		
No	41.3 (51/136)	30.1 (39/102)
Yes	61.2 (52/87)	73.1 (117/163)
Tough Man		
Disagree	45.1 (76/169)	59.0 (82/136)
Agree	58.0 (27/54)	49.7 (74/129)
Fear		
No	49.9 (22/42)	64.8 (50/80)
Yes	48.4 (81/181)	49.7 (106/185)
Observation		
No	39.3 (33/80)	40.7 (27/65)
Yes	53.8 (70/143)	59.0 (129/200)
Victimization		
No	55.9 (62/117)	44.7 (42/86)
Yes	40.1 (41/106)	58.8 (113/178)

Prevalence of Condom Use at Last Sex and Cross-tabulation of Condom Use at Last Sex by all Covariates, by gender Johannesburg Sample, 2013 WAVE Study		
Variable	Females	Males
	Condom Use at Last Sex (N=101)	Condom Use at Last Sex (N=150)
Total	76.4 (76/101)	70.6 (108/150)
Age Group		
15-16	50.1 (8/14)	53.3 (15/24)
17-19	80.4 (68/87)	73.7 (93/126)
Raised		
2 Parents	82.3 (28/39)	67.4 (32/43)
Other	71.9 (48/62)	71.9 (76/107)
Female Adult Social Support Scale		
Low	65.2 (10/18)	74.9 (24/32)
High	79.3 (66/83)	69.4 (84/118)
Male Adult Social Support Scale		
Low	75.0 (29/42)	58.9 (35/57)
High	77.7 (47/59)	77.6 (73/93)
Alcohol Last Month		
No	85.6 (41/50)	78.1 (29/37)
Yes	66.1 (35/51)	68.3 (79/113)
Tough Man		
Disagree	76.8 (55/74)	69.3 (57/80)
Agree	75.6 (21/27)	72.2 (51/70)
Partner Type		
Relationship	78.5 (75/97)	72.3 (78/108)
Other	18.8 (1/4)	66.1 (30/42)
Fear		
No	86.0 (17/21)	70.5 (34/46)
Yes	74.0 (59/80)	70.7 (74/104)
Observation		
No	87.7 (27/32)	67.1 (20/24)
Yes	71.9 (49/69)	71.4 (88/126)
Victimization		
No	80.8 (49/61)	77.7 (32/39)
Yes	68.9 (27/40)	68.5 (76/110)

Regression Results for Johannesburg that are similar to Paper 1

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Females) Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.0 (0.7 - 1.5)			1.1 (0.7 - 1.5)
Observation		1.9*** (1.5 - 2.3)		2.4*** (2.1 - 2.7)
Victimization			0.5** (0.4 - 0.8)	0.4*** (0.3 - 0.6)
Raised by (ref: 2 parents)	0.7 (0.5 - 1.0)	0.7* (0.5 - 1.0)	0.7 (0.5 - 1.0)	0.7 (0.5 - 1.0)
Adult Female Social Support	1.0 (0.5 - 2.2)	1.1 (0.5 - 2.3)	1.0 (0.4 - 2.1)	1.1 (0.4 - 2.5)
Adult Male Social Support	0.5* (0.3 - 1.0)	0.6 (0.3 - 1.0)	0.5 (0.2 - 1.0)	0.5 (0.3 - 1.1)
Age (ref: <17)	5.9*** (3.3 - 10.5)	6.3*** (3.5 - 11.5)	5.7*** (3.2 - 10.1)	6.2*** (3.3 - 11.8)
Drank alcohol last month	3.0*** (1.8 - 5.2)	2.8*** (1.7 - 4.8)	3.1*** (1.8 - 5.4)	2.9** (1.6 - 5.0)
Believe men should be tough	1.9* (1.0 - 3.4)	2.0* (1.0 - 3.7)	1.8 (1.0 - 3.5)	2.0* (1.0 - 4.0)
Constant	0.2** (0.1 - 0.5)	0.1*** (0.1 - 0.3)	0.4** (0.2 - 0.7)	0.2*** (0.1 - 0.4)
Observations	488	488	488	488

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Males) Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4* (0.2 - 0.9)			0.4** (0.2 - 0.6)
Observation		1.3 (0.8 - 2.0)		1.4** (1.1 - 1.8)
Victimization			1.4 (0.8 - 2.3)	1.5* (1.0 - 2.2)
Raised by (ref: 2 parents)	1.2 (0.6 - 2.7)	1.3 (0.6 - 2.8)	1.3 (0.6 - 2.8)	1.3 (0.6 - 2.8)
Adult Female Social Support	0.9 (0.5 - 1.6)	1.0 (0.5 - 1.8)	1.0 (0.5 - 1.8)	0.9 (0.5 - 1.6)
Adult Male Social Support	0.8 (0.6 - 1.2)	0.8 (0.5 - 1.3)	0.8 (0.5 - 1.3)	0.8 (0.5 - 1.3)
Age (ref: <17)	4.5*** (3.2 - 6.3)	4.5*** (3.2 - 6.1)	4.4*** (3.1 - 6.3)	4.5*** (3.2 - 6.4)
Drank alcohol last month	7.2*** (5.5 - 9.3)	6.3*** (4.9 - 8.2)	6.4*** (4.9 - 8.4)	6.5*** (5.1 - 8.2)
Believe men should be tough	0.8 (0.4 - 1.6)	0.8 (0.3 - 2.0)	0.8 (0.3 - 2.1)	0.8 (0.3 - 1.9)
Constant	0.3*** (0.2 - 0.4)	0.1*** (0.1 - 0.3)	0.1*** (0.1 - 0.3)	0.2*** (0.1 - 0.4)
Observations	488	488	487	487

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Females) Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	0.6 (0.1 - 7.3)			0.8 (0.1 - 10.1)
Observation		0.4 (0.1 - 1.5)		0.5 (0.1 - 2.2)
Victimization			0.6 (0.3 - 1.4)	0.8 (0.4 - 1.6)
Raised by (ref: 2 parents)	0.6 (0.1 - 4.5)	0.6 (0.1 - 2.4)	0.6 (0.1 - 3.1)	0.6 (0.1 - 3.5)
Adult Male Social Support	1.2 (0.5 - 2.7)	1.2 (0.6 - 2.3)	1.1 (0.5 - 2.6)	1.2 (0.6 - 2.4)
Age (ref: <17)	3.2 (0.9 - 11.2)	3.6* (1.2 - 11.2)	3.1* (1.0 - 9.2)	3.4* (1.1 - 10.2)
Drank alcohol last month	0.3* (0.1 - 1.0)	0.4* (0.1 - 0.9)	0.3* (0.1 - 1.0)	0.4* (0.1 - 0.9)
Believe men should be tough	1.3 (0.7 - 2.4)	1.2 (0.6 - 2.3)	1.2 (0.5 - 2.7)	1.2 (0.7 - 2.1)
Partner Type (ref: relationship)	0.2*** (0.1 - 0.3)	0.2** (0.1 - 0.4)	0.2** (0.1 - 0.4)	0.2*** (0.1 - 0.4)
Constant	4.1 (0.7 - 23.4)	4.6* (1.2 - 17.5)	3.5* (1.2 - 10.2)	5.8* (1.6 - 21.4)
Observations	365	365	365	365

95% CI in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Males) Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	1.0 (0.5 - 2.1)			1.0 (0.6 - 1.6)
Observation		1.5 (0.4 - 5.5)		1.6 (0.5 - 5.3)
Victimization			0.9 (0.3 - 2.2)	0.8 (0.5 - 1.3)
Raised by (ref: 2 parents)	1.3 (0.9 - 2.0)	1.4 (0.9 - 2.1)	1.2 (0.8 - 1.8)	1.3 (0.8 - 2.0)
Adult Male Social Support	3.0** (1.7 - 5.4)	3.0*** (1.8 - 4.9)	3.1** (1.6 - 6.3)	3.0*** (1.7 - 5.2)
Age (ref: <17)	3.5* (1.4 - 8.9)	3.5** (1.4 - 8.4)	3.6* (1.4 - 9.3)	3.5** (1.4 - 8.4)
Drank alcohol last month	0.7 (0.2 - 2.1)	0.6 (0.3 - 1.3)	0.7 (0.3 - 1.8)	0.6 (0.3 - 1.2)
Believe men should be tough	0.8 (0.6 - 1.1)	0.8 (0.5 - 1.3)	0.8 (0.6 - 1.1)	0.8 (0.5 - 1.3)
Partner Type (ref: relationship)	1.1 (0.8 - 1.6)	1.1 (0.7 - 1.7)	1.2 (0.9 - 1.7)	1.3 (0.8 - 1.9)
Constant	0.5 (0.1 - 5.5)	0.4 (0.0 - 6.6)	0.6 (0.0 - 8.2)	0.5 (0.0 - 10.1)
Observations	372	372	371	371

95% CI in parentheses

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

Prevalence of Depression and PTSD Cross-tabulation of Depression and PTSD by both Outcomes, All Violence Variables, and All Covariates, by gender Johannesburg Sample, 2013 WAVE Study				
	Females		Males	
	Depression (%, N) N=223	PTSD (%, N) N=223	Depression (%, N) N=265	PTSD (%, N) N=265
Total	48.3 (98/223)	40.4 (94/223)	48.0 (130/265)	31.6 (83/265)
Sex in Last 12 Months				
No	48.6 (51/120)	37.2 (46/120)	50.2 (51/109)	26.1 (25/109)
Yes	48.0 (47/103)	43.8 (48/103)	46.1 (79/156)	36.2 (58/156)
Condom Use at Last Sex				
No	67.7 (16/25)	46.0 (13/25)	53.9 (26/42)	48.2 (19/42)
Yes	41.2 (30/76)	43.6 (34/76)	41.3 (49/108)	28.2 (34/108)
Fear				
No	28.0 (12/42)	19.6 (11/42)	43.7 (36/80)	25.6 (19/80)
Yes	53.3 (86/181)	45.5 (83/181)	49.8 (94/185)	34.1 (64/185)
Observation				
No	34.1 (26/80)	28.0 (26/80)	36.9 (38/65)	21.9 (13/65)
Yes	56.0 (72/143)	47.0 (68/143)	52.0 (102/200)	35.0 (70/200)
Victimization				
No	39.1 (41/117)	34.9 (40/117)	34.5 (32/86)	24.3 (20/86)
Yes	59.3 (57/106)	47.0 (54/106)	54.7 (97/178)	35.0 (62/178)
Age Group				
15-16	56.4 (30/53)	35.4 (21/53)	51.7 (33/69)	30.3 (18/69)
17-19	45.5 (68/170)	42.2 (73/170)	46.3 (97/196)	32.2 (65/196)
Raised				
2 Parents	42.6 (32/81)	36.9 (30/81)	48.1 (36/82)	30.9 (22/82)
Other	52.1 (66/142)	42.7 (64/142)	48.0 (94/193)	31.8 (61/183)
Females Adult Social Support				
Low	71.7 (29/42)	55.6 (26/42)	50.7 (33/56)	36.3 (21/56)
High	42.5 (69/181)	36.6 (68/181)	47.3 (97/209)	30.3 (62/209)
Male Adult Social Support				
Low	50.7 (39/83)	47.4 (42/83)	57.7 (51/86)	43.2 (36/86)
High	46.8 (59/140)	36.0 (52/140)	42.9 (79/179)	25.5 (47/179)
Alcohol (last month)				
No	47.6 (56/136)	40.7 (55/136)	43.1 (41/102)	25.7 (23/102)
Yes	49.6 (42/87)	39.9 (39/87)	51.9 (89/163)	36.2 (60/163)
Tough Man				
Disagree	45.6 (73/169)	42.3 (73/169)	47.8 (66/136)	30.4 (42/136)
Agree	55.2 (25/54)	35.6 (21/54)	48.2 (64/129)	32.7 (41/129)
Partner Type	(only asked of those who had a partner in last year)			
Relationship	45.5 (42/97)	43.3 (44/97)	40.8 (49/108)	30.5 (33/108)
Other	100 (3/3)	54.6 (2/3)	55.4 (24/40)	45.2 (20/40)

Regression Results for Johannesburg that are similar to Paper 2

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Females), adjusting for Depression Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.0 (0.7 - 1.4)			1.0 (0.7 - 1.6)
Observation		1.9*** (1.6 - 2.2)		2.3*** (2.1 - 2.6)
Victimization			0.5** (0.4 - 0.8)	0.4*** (0.3 - 0.6)
Depression	1.1 (0.9 - 1.4)	1.0 (0.8 - 1.3)	1.3* (1.0 - 1.6)	1.1 (0.9 - 1.4)
Raised by (ref: 2 parents)	0.7* (0.5 - 1.0)	0.7* (0.5 - 0.9)	0.7 (0.5 - 1.0)	0.7 (0.5 - 1.0)
Adult Female Social Support	1.0 (0.5 - 2.2)	1.1 (0.5 - 2.3)	1.0 (0.5 - 2.2)	1.1 (0.5 - 2.6)
Adult Male Social Support	0.5* (0.3 - 1.0)	0.6 (0.3 - 1.0)	0.5* (0.2 - 1.0)	0.5 (0.3 - 1.0)
Age (ref: <17)	6.0*** (3.3 - 10.6)	6.3*** (3.4 - 11.6)	5.8*** (3.2 - 10.5)	6.3*** (3.3 - 12.0)
Drank alcohol last month	3.1*** (1.8 - 5.2)	2.8*** (1.7 - 4.8)	3.1*** (1.8 - 5.4)	2.9** (1.6 - 5.0)
Believe men should be tough	1.8* (1.0 - 3.4)	2.0* (1.0 - 3.7)	1.8 (1.0 - 3.5)	2.0* (1.0 - 3.9)
Constant	0.2** (0.1 - 0.5)	0.1*** (0.1 - 0.3)	0.3** (0.2 - 0.6)	0.2*** (0.1 - 0.4)
Observations	488	488	488	488

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Males), adjusting for Depression Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.5* (0.2 - 0.9)			0.4** (0.2 - 0.7)
Observation		1.3 (0.8 - 2.2)		1.4* (1.0 - 1.9)
Victimization			1.5 (0.7 - 3.0)	1.6 (0.9 - 2.9)
Depression	0.7 (0.3 - 1.9)	0.7 (0.3 - 1.7)	0.6 (0.2 - 1.8)	0.6 (0.2 - 1.9)
Raised by (ref: 2 parents)	1.2 (0.5 - 2.8)	1.3 (0.6 - 2.8)	1.3 (0.6 - 2.8)	1.3 (0.6 - 2.9)
Adult Female Social Support	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.7)	0.9 (0.5 - 1.7)	0.9 (0.5 - 1.5)
Adult Male Social Support	0.8 (0.5 - 1.3)	0.7 (0.4 - 1.4)	0.7 (0.4 - 1.4)	0.8 (0.4 - 1.5)
Age (ref: <17)	4.5*** (3.2 - 6.3)	4.4*** (3.2 - 6.0)	4.3*** (3.1 - 6.2)	4.4*** (3.1 - 6.4)
Drank alcohol last month	7.5*** (5.9 - 9.5)	6.6*** (5.3 - 8.2)	6.7*** (5.1 - 8.9)	6.8*** (5.2 - 8.7)
Believe men should be tough	0.8 (0.4 - 1.7)	0.8 (0.3 - 2.0)	0.8 (0.3 - 2.3)	0.8 (0.3 - 2.0)
Constant	0.4** (0.2 - 0.7)	0.2*** (0.1 - 0.3)	0.2*** (0.1 - 0.4)	0.2*** (0.1 - 0.4)
Observations	488	488	487	487

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Females), adjusting for Depression Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	0.9 (0.1 - 13.5)			1.0 (0.1 - 15.0)
Observation		0.5 (0.2 - 1.6)		0.5 (0.1 - 2.1)
Victimization			0.8 (0.4 - 1.5)	0.9 (0.4 - 1.7)
Depression	0.4 (0.1 - 1.1)	0.5* (0.2 - 0.9)	0.4* (0.2 - 0.9)	0.5* (0.2 - 1.0)
Raised by (ref: 2 parents)	0.7 (0.1 - 4.0)	0.7 (0.2 - 2.9)	0.7 (0.2 - 3.4)	0.7 (0.1 - 3.5)
Adult Male Social Support	1.2 (0.6 - 2.6)	1.2 (0.6 - 2.3)	1.2 (0.5 - 2.7)	1.2 (0.6 - 2.4)
Age (ref: <17)	3.3* (1.0 - 10.8)	3.5* (1.2 - 10.5)	3.2* (1.1 - 9.2)	3.4* (1.2 - 9.9)
Drank alcohol last month	0.3* (0.1 - 0.9)	0.4* (0.1 - 0.9)	0.3* (0.1 - 0.9)	0.3* (0.1 - 0.9)
Believe men should be tough	1.4 (0.7 - 2.6)	1.3 (0.6 - 2.6)	1.3 (0.6 - 3.3)	1.3 (0.8 - 2.2)
Partner Type	0.2** (0.1 - 0.5)	0.2** (0.1 - 0.6)	0.2** (0.1 - 0.6)	0.2** (0.1 - 0.5)
Constant	4.1 (0.6 - 26.8)	5.4* (1.5 - 19.0)	4.3* (1.5 - 12.3)	5.7* (1.5 - 22.6)
Observations	366	366	366	366

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Males), adjusting for Depression Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	1.0 (0.5 - 2.1)			1.0 (0.6 - 1.6)
Observation		1.5 (0.4 - 5.7)		1.6 (0.5 - 5.3)
Victimization			0.9 (0.4 - 2.3)	0.8 (0.5 - 1.3)
Depression	0.8 (0.5 - 1.1)	0.7 (0.5 - 1.1)	0.8 (0.5 - 1.2)	0.8 (0.5 - 1.1)
Raised by (ref: 2 parents)	1.3 (0.9 - 1.8)	1.3 (0.9 - 1.9)	1.2 (0.8 - 1.7)	1.3 (0.9 - 1.9)
Adult Male Social Support	2.9** (1.6 - 5.4)	2.9** (1.7 - 4.9)	3.0** (1.5 - 6.4)	2.9** (1.6 - 5.2)
Age (ref: <17)	3.4** (1.5 - 8.2)	3.4** (1.5 - 7.7)	3.6** (1.5 - 8.7)	3.5** (1.5 - 7.9)
Drank alcohol last month	0.7 (0.3 - 2.2)	0.7 (0.3 - 1.4)	0.8 (0.3 - 1.9)	0.7 (0.3 - 1.3)
Believe men should be tough	0.8 (0.6 - 1.1)	0.8 (0.5 - 1.2)	0.8 (0.6 - 1.1)	0.8 (0.5 - 1.3)
Partner Type	1.1 (0.8 - 1.6)	1.2 (0.7 - 1.8)	1.2 (0.9 - 1.7)	1.3 (0.8 - 1.9)
Constant	0.6 (0.1 - 6.4)	0.5 (0.0 - 7.4)	0.6 (0.0 - 9.2)	0.5 (0.0 - 11.0)
Observations	373	373	372	372

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Females), adjusting for PTSD Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.0 (0.7 - 1.4)			1.0 (0.7 - 1.5)
Observation		1.8*** (1.4 - 2.3)		2.3*** (1.9 - 2.7)
Victimization			0.5** (0.3 - 0.8)	0.4*** (0.3 - 0.6)
PTSD	1.3* (1.0 - 1.7)	1.2 (0.9 - 1.6)	1.4* (1.0 - 2.0)	1.3 (0.9 - 1.8)
Raised by (ref: 2 parents)	0.7 (0.5 - 1.0)	0.7* (0.5 - 1.0)	0.7 (0.5 - 1.0)	0.7 (0.5 - 1.0)
Adult Female Social Support	1.1 (0.5 - 2.3)	1.1 (0.5 - 2.4)	1.0 (0.4 - 2.4)	1.1 (0.4 - 2.7)
Adult Male Social Support	0.5 (0.3 - 1.0)	0.6 (0.3 - 1.1)	0.5 (0.2 - 1.0)	0.5 (0.3 - 1.1)
Age (ref: <17)	5.8*** (3.2 - 10.5)	6.2*** (3.4 - 11.5)	5.6*** (3.0 - 10.3)	6.1*** (3.2 - 11.9)
Drank alcohol last month	3.1*** (1.8 - 5.3)	2.9*** (1.7 - 4.8)	3.2*** (1.8 - 5.5)	2.9** (1.7 - 5.1)
Believe men should be tough	1.9* (1.0 - 3.5)	2.0* (1.1 - 3.8)	2.0* (1.0 - 3.7)	2.1* (1.1 - 4.1)
Constant	0.2*** (0.1 - 0.5)	0.1*** (0.1 - 0.3)	0.3** (0.2 - 0.6)	0.2*** (0.1 - 0.4)
Observations	488	488	488	488

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Males), adjusting for PTSD Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4** (0.2 - 0.8)			0.4*** (0.2 - 0.6)
Observation		1.2 (0.8 - 2.0)		1.4* (1.1 - 1.8)
Victimization			1.3 (0.7 - 2.4)	1.5 (1.0 - 2.2)
PTSD	1.5 (0.9 - 2.5)	1.3 (0.8 - 2.3)	1.3 (0.8 - 2.2)	1.4 (0.8 - 2.5)
Raised by (ref: 2 parents)	1.2 (0.6 - 2.7)	1.3 (0.6 - 2.8)	1.3 (0.7 - 2.8)	1.3 (0.6 - 2.8)
Adult Female Social Support	0.9 (0.5 - 1.6)	1.0 (0.5 - 1.8)	1.0 (0.5 - 1.8)	0.9 (0.5 - 1.5)
Adult Male Social Support	0.9 (0.6 - 1.5)	0.8 (0.5 - 1.5)	0.8 (0.5 - 1.5)	0.9 (0.5 - 1.5)
Age (ref: <17)	4.6*** (3.3 - 6.3)	4.5*** (3.2 - 6.4)	4.4*** (3.0 - 6.5)	4.5*** (3.2 - 6.4)
Drank alcohol last month	7.0*** (5.4 - 9.1)	6.3*** (4.8 - 8.2)	6.3*** (4.8 - 8.3)	6.4*** (5.0 - 8.2)
Believe men should be tough	0.8 (0.4 - 1.6)	0.8 (0.3 - 1.9)	0.8 (0.3 - 2.0)	0.8 (0.3 - 1.8)
Constant	0.3*** (0.2 - 0.4)	0.1*** (0.1 - 0.2)	0.1*** (0.1 - 0.2)	0.2*** (0.1 - 0.3)
Observations	488	488	487	487

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Females), adjusting for PTSD Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	0.7 (0.1 - 8.1)			0.8 (0.1 - 9.8)
Observation		0.4 (0.1 - 1.6)		0.5 (0.1 - 2.2)
Victimization			0.7 (0.3 - 1.4)	0.8 (0.4 - 1.6)
PTSD	0.9 (0.5 - 1.5)	0.9 (0.4 - 1.9)	0.8 (0.4 - 1.7)	1.0 (0.6 - 1.6)
Raised by (ref: 2 parents)	0.6 (0.1 - 4.7)	0.6 (0.1 - 2.7)	0.6 (0.1 - 3.5)	0.6 (0.1 - 3.7)
Adult Male Social Support	1.2 (0.5 - 2.7)	1.2 (0.6 - 2.4)	1.1 (0.5 - 2.7)	1.2 (0.6 - 2.4)
Age (ref: <17)	3.5 (1.0 - 12.2)	3.8* (1.3 - 11.6)	3.3* (1.1 - 10.1)	3.5* (1.2 - 10.3)
Drank alcohol last month	0.3* (0.1 - 1.0)	0.4* (0.2 - 0.9)	0.3* (0.1 - 1.0)	0.4* (0.1 - 0.9)
Believe men should be tough	1.3 (0.7 - 2.4)	1.2 (0.6 - 2.4)	1.2 (0.5 - 2.8)	1.2 (0.7 - 2.1)
Partner Type	0.2*** (0.1 - 0.3)	0.2*** (0.1 - 0.4)	0.2** (0.1 - 0.4)	0.2*** (0.1 - 0.4)
Constant	3.8 (0.6 - 22.3)	4.6* (1.2 - 17.2)	3.4* (1.2 - 9.8)	5.7* (1.6 - 20.5)
Observations	366	366	366	366

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Males), adjusting for PTSD Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	1.1 (0.5 - 2.3)			1.1 (0.6 - 1.7)
Observation		1.9 (0.5 - 7.5)		2.0 (0.6 - 6.8)
Victimization			0.9 (0.3 - 2.6)	0.8 (0.5 - 1.3)
PTSD	0.5* (0.3 - 0.9)	0.4* (0.2 - 0.8)	0.5* (0.3 - 0.9)	0.5* (0.2 - 0.9)
Raised by (ref: 2 parents)	1.2 (0.9 - 1.7)	1.3 (0.9 - 1.8)	1.1 (0.8 - 1.6)	1.2 (0.9 - 1.7)
Adult Male Social Support	2.8** (1.5 - 5.2)	2.7** (1.6 - 4.5)	2.9* (1.4 - 6.4)	2.7** (1.5 - 4.8)
Age (ref: <17)	3.5** (1.5 - 7.9)	3.4** (1.6 - 7.1)	3.6** (1.5 - 8.3)	3.4** (1.6 - 7.0)
Drank alcohol last month	0.8 (0.2 - 2.4)	0.6 (0.3 - 1.4)	0.8 (0.3 - 2.0)	0.7 (0.3 - 1.3)
Believe men should be tough	0.8 (0.6 - 1.0)	0.8 (0.5 - 1.2)	0.8 (0.5 - 1.1)	0.8 (0.5 - 1.3)
Partner Type	1.2 (0.7 - 1.8)	1.2 (0.7 - 2.0)	1.2 (0.8 - 1.8)	1.3 (0.8 - 2.1)
Constant	0.7 (0.1 - 6.9)	0.5 (0.0 - 6.7)	0.7 (0.0 - 10.9)	0.5 (0.0 - 10.7)
Observations	373	373	372	372

95% CI in parentheses

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

Model 4 in Both Sites

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months, by gender, adjusting for Depression and PTSD Baltimore and Johannesburg Samples, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR Baltimore Female	(2) Sex_L12 aOR Johannesburg Female	(3) Sex_L12 aOR Baltimore Male	(4) Sex_L12 aOR Johannesburg Male
Fear	1.1 (0.8 - 1.6)	1.0 (0.7 - 1.5)	0.4** (0.2 - 0.6)	0.4** (0.2 - 0.6)
Observation	3.3*** (2.8 - 3.9)	2.3*** (2.0 - 2.6)	2.8** (1.5 - 5.1)	1.3 (0.9 - 1.8)
Victimization	2.6*** (1.9 - 3.4)	0.4*** (0.3 - 0.6)	1.8 (0.5 - 6.2)	1.7 (0.9 - 3.3)
Depression	1.3 (0.9 - 2.0)	1.0 (0.7 - 1.5)	1.0 (0.3 - 3.9)	0.5 (0.2 - 1.5)
PTSD	2.3* (1.2 - 4.4)	1.3 (0.8 - 2.1)	0.7 (0.3 - 1.5)	1.9** (1.2 - 3.1)
Raised by (ref: 2 parents)	0.5** (0.3 - 0.7)	0.7 (0.5 - 1.0)	1.6 (1.0 - 2.7)	1.3 (0.6 - 2.8)
Adult Female Social Support	0.9 (0.8 - 1.1)	1.1 (0.4 - 2.6)	0.8 (0.1 - 7.0)	0.9 (0.5 - 1.4)
Adult Male Social Support	2.9*** (1.9 - 4.6)	0.5 (0.3 - 1.1)	1.1 (0.5 - 2.8)	0.9 (0.4 - 1.7)
Age (ref: <17)	2.6*** (1.9 - 3.6)	6.1*** (3.2 - 11.9)	1.9 (1.0 - 3.7)	4.5*** (3.1 - 6.4)
Drank alcohol last month	1.4* (1.0 - 1.9)	2.9** (1.7 - 5.1)	0.9 (0.6 - 1.2)	6.8*** (5.4 - 8.5)
Believe men should be tough	1.5 (0.9 - 2.4)	2.1* (1.1 - 4.0)	1.1 (0.6 - 2.0)	0.8 (0.3 - 1.9)
Constant	0.1*** (0.1 - 0.2)	0.2*** (0.1 - 0.4)	1.3 (0.1 - 16.7)	0.2*** (0.1 - 0.4)
Observations	444	488	439	487

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex, by gender, adjusting for Depression and PTSD Baltimore and Johannesburg Samples, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR Baltimore Female	(2) Condom Use aOR Johannesburg Female	(3) Condom Use aOR Baltimore Male	(4) Condom Use aOR Johannesburg Male
Fear	0.3* (0.1 - 0.8)	0.9 (0.1 - 11.4)	1.1 (0.4 - 3.0)	1.1 (0.6 - 1.7)
Observation	1.3 (0.8 - 2.1)	0.5 (0.1 - 2.0)	0.5* (0.3 - 1.0)	2.1 (0.6 - 7.0)
Victimization	1.7* (1.1 - 2.4)	0.8 (0.4 - 1.7)	0.5 (0.2 - 1.7)	0.8 (0.5 - 1.3)
Depression	1.2 (0.6 - 2.6)	0.4* (0.1 - 1.0)	1.5 (0.7 - 3.1)	1.1 (0.8 - 1.6)
PTSD	0.4*** (0.2 - 0.6)	1.7 (0.8 - 3.7)	0.7 (0.2 - 2.7)	0.4* (0.2 - 0.9)
Raised by (ref: 2 parents)	1.3 (0.7 - 2.4)	0.7 (0.1 - 3.3)	2.9* (1.3 - 6.7)	1.2 (0.9 - 1.8)
Adult Male Social Support	4.0*** (2.4 - 6.7)	1.3 (0.6 - 2.9)	2.4** (1.5 - 3.8)	2.7** (1.6 - 4.8)
Age (ref: <17)	0.7* (0.5 - 1.0)	2.8* (1.2 - 6.8)	0.4*** (0.2 - 0.6)	3.4** (1.6 - 7.1)
Drank alcohol last month	0.9 (0.4 - 2.1)	0.4* (0.2 - 0.8)	0.9 (0.5 - 1.7)	0.6 (0.3 - 1.2)
Believe men should be tough	0.7 (0.3 - 1.4)	1.4 (0.8 - 2.4)	0.9 (0.5 - 1.7)	0.8 (0.5 - 1.3)
Partner Type	0.4*** (0.3 - 0.6)	0.2** (0.1 - 0.5)	0.3* (0.1 - 0.8)	1.3 (0.8 - 2.1)
Constant	1.4 (0.8 - 2.5)	6.1* (1.7 - 21.9)	2.3 (0.3 - 20.1)	0.5 (0.0 - 11.0)
Observations	359	366	363	372

95% CI in parentheses

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

Sensitivity Analyses using a Higher PTSD Cutoff point

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Females), adjusting for PTSD with a higher cutoff Baltimore Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.5** (1.2 - 1.8)			1.1 (0.8 - 1.5)
Observation		3.7*** (3.4 - 4.0)		3.2*** (2.8 - 3.7)
Victimization			2.9*** (2.3 - 3.6)	2.3*** (1.8 - 3.0)
PTSD (higher cutoff)	3.0** (1.8 - 4.7)	3.2*** (2.1 - 4.9)	2.4*** (1.7 - 3.5)	2.7*** (2.0 - 3.8)
Raised by (ref: 2 parents)	0.6** (0.5 - 0.8)	0.5* (0.4 - 0.8)	0.5** (0.4 - 0.8)	0.5** (0.3 - 0.8)
Adult Female Social Support	0.5* (0.3 - 0.9)	0P5* (0.3 - 0.8)	0.6** (0.4 - 0.8)	0.6** (0.5 - 0.8)
Adult Male Social Support	2.4*** (1.8 - 3.2)	2.7*** (1.9 - 3.8)	2.4*** (1.9 - 2.9)	2.8*** (2.0 - 4.0)
Age (ref: <17)	2.0* (1.2 - 3.5)	2.0** (1.4 - 2.8)	2.1** (1.3 - 3.4)	2.1** (1.5 - 2.9)
Drank alcohol last month	1.7** (1.3 - 2.3)	1.7** (1.2 - 2.3)	1.8** (1.3 - 2.3)	1.7** (1.3 - 2.3)
Believe men should be tough	1.5 (0.8 - 2.7)	1.4 (0.9 - 2.2)	1.4 (0.8 - 2.4)	1.3 (0.8 - 2.1)
Constant	0.6* (0.3 - 1.0)	0.4** (0.2 - 0.6)	0.6* (0.4 - 0.9)	0.3*** (0.2 - 0.4)
Observations	446	444	446	444

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Males), adjusting for PTSD with a higher cutoff Baltimore Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4** (0.3 - 0.6)			0.4*** (0.3 - 0.6)
Observation		2.7*** (1.9 - 4.0)		2.9** (1.6 - 5.1)
Victimization			2.3 (0.6 - 8.0)	1.9 (0.5 - 6.9)
PTSD (higher cutoff)	0.8 (0.3 - 2.4)	0.5 (0.2 - 1.5)	0.5 (0.1 - 1.9)	0.4 (0.2 - 1.3)
Raised by (ref: 2 parents)	1.5 (0.8 - 2.6)	1.9* (1.2 - 3.0)	1.8* (1.0 - 3.2)	1.7* (1.1 - 2.6)
Adult Female Social Support	0.8 (0.1 - 4.9)	0.7 (0.1 - 4.6)	0.9 (0.1 - 7.8)	0.9 (0.1 - 6.7)
Adult Male Social Support	0.9 (0.3 - 2.2)	1.4 (0.6 - 3.4)	1.3 (0.5 - 3.3)	1.1 (0.6 - 2.2)
Age (ref: <17)	1.8** (1.3 - 2.6)	1.8* (1.1 - 3.1)	2.0** (1.3 - 3.1)	2.0 (1.0 - 4.0)
Drank alcohol last month	1.3 (1.0 - 1.8)	1.0 (0.6 - 1.7)	1.4 (1.0 - 1.9)	0.9 (0.5 - 1.6)
Believe men should be tough	1.1 (0.6 - 2.2)	1.2 (0.6 - 2.3)	1.4 (0.7 - 2.5)	1.1 (0.6 - 2.0)
Constant	2.9 (0.3 - 28.3)	0.9 (0.1 - 15.8)	0.9 (0.0 - 15.8)	1.3 (0.1 - 16.1)
Observations	442	443	440	439

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Females), adjusting for PTSD with a higher cutoff Baltimore Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	0.3* (0.1 - 0.9)			0.3* (0.1 - 0.8)
Observation		1.4 (0.9 - 2.0)		1.3 (0.8 - 2.2)
Victimization			1.2 (0.7 - 2.1)	1.7* (1.0 - 2.9)
PTSD (higher cutoff)	0.4* (0.2 - 0.8)	0.5*** (0.3 - 0.6)	0.4*** (0.3 - 0.6)	0.4* (0.2 - 0.8)
Raised by (ref: 2 parents)	1.6 (0.9 - 2.6)	1.8** (1.3 - 2.4)	1.9*** (1.4 - 2.5)	1.3 (0.7 - 2.4)
Adult Male Social Support	3.9** (2.1 - 7.0)	4.4*** (2.5 - 7.8)	4.7*** (3.1 - 7.2)	4.0*** (2.2 - 7.2)
Age (ref: <17)	0.7* (0.5 - 1.0)	0.5** (0.4 - 0.8)	0.6** (0.4 - 0.8)	0.7 (0.5 - 1.0)
Drank alcohol last month	0.9 (0.4 - 2.2)	0.9 (0.5 - 1.6)	0.8 (0.4 - 1.7)	0.9 (0.4 - 2.0)
Believe men should be tough	0.8 (0.4 - 1.6)	0.9 (0.5 - 1.6)	1.0 (0.5 - 1.8)	0.7 (0.3 - 1.4)
Partner Type	0.4** (0.3 - 0.6)	0.4** (0.2 - 0.6)	0.3*** (0.2 - 0.5)	0.4*** (0.3 - 0.6)
Constant	1.8* (1.2 - 2.7)	0.5 (0.2 - 1.3)	0.5* (0.3 - 0.9)	1.4 (0.9 - 2.3)
Observations	360	359	360	359

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Males), adjusting for PTSD with a higher cutoff Baltimore Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	1.1 (0.5 - 2.3)			1.2 (0.5 - 2.9)
Observation		0.5** (0.3 - 0.8)		0.6* (0.3 - 1.0)
Victimization			0.5 (0.2 - 1.3)	0.6 (0.1 - 2.2)
PTSD (higher cutoff)	0.6 (0.2 - 1.8)	0.7 (0.2 - 2.2)	0.8 (0.3 - 2.5)	0.8 (0.2 - 2.7)
Raised by (ref: 2 parents)	3.9*** (2.2 - 6.9)	2.8* (1.2 - 6.1)	2.9* (1.2 - 7.2)	2.9* (1.3 - 6.5)
Adult Male Social Support	3.5*** (2.7 - 4.5)	2.4** (1.4 - 4.4)	2.4** (1.6 - 3.6)	2.4** (1.5 - 3.9)
Age (ref: <17)	0.4** (0.2 - 0.6)	0.4** (0.2 - 0.6)	0.4*** (0.3 - 0.5)	0.4*** (0.2 - 0.5)
Drank alcohol last month	0.9 (0.5 - 1.8)	1.0 (0.5 - 2.0)	0.9 (0.5 - 1.7)	1.0 (0.5 - 1.8)
Believe men should be tough	0.9 (0.5 - 1.5)	0.9 (0.5 - 1.6)	0.8 (0.5 - 1.3)	0.9 (0.5 - 1.6)
Partner Type	0.3* (0.1 - 0.8)	0.3* (0.1 - 0.9)	0.3* (0.1 - 0.8)	0.3* (0.1 - 0.8)
Constant	0.9 (0.2 - 3.7)	2.2 (0.2 - 20.1)	1.7 (0.3 - 8.8)	2.2 (0.3 - 17.0)
Observations	365	365	364	363

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Females), adjusting for PTSD with a higher cutoff Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	1.0 (0.7 - 1.5)			1.0 (0.7 - 1.5)
Observation		1.9*** (1.5 - 2.3)		2.4*** (2.1 - 2.7)
Victimization			0.5** (0.4 - 0.8)	0.4*** (0.3 - 0.6)
PTSD (higher cutoff)	1.1 (0.8 - 1.6)	1.1 (0.8 - 1.5)	1.2 (0.9 - 1.7)	1.2 (0.9 - 1.7)
Raised by (ref: 2 parents)	0.7 (0.5 - 1.0)	0.7* (0.5 - 1.0)	0.7 (0.5 - 1.0)	0.7 (0.5 - 1.0)
Adult Female Social Support	1.0 (0.5 - 2.2)	1.1 (0.5 - 2.3)	1.0 (0.4 - 2.1)	1.1 (0.4 - 2.5)
Adult Male Social Support	0.5 (0.3 - 1.0)	0.6 (0.3 - 1.1)	0.5 (0.2 - 1.0)	0.5 (0.3 - 1.1)
Age (ref: <17)	5.9*** (3.3 - 10.6)	6.4*** (3.4 - 11.7)	5.7*** (3.1 - 10.4)	6.3*** (3.3 - 12.2)
Drank alcohol last month	3.1*** (1.8 - 5.2)	2.8*** (1.7 - 4.8)	3.1*** (1.8 - 5.4)	2.9** (1.6 - 5.0)
Believe men should be tough	1.9* (1.0 - 3.4)	2.0* (1.0 - 3.7)	1.8 (1.0 - 3.5)	2.0* (1.0 - 4.0)
Constant	0.2*** (0.1 - 0.5)	0.1*** (0.1 - 0.3)	0.3** (0.2 - 0.6)	0.2*** (0.1 - 0.4)
Observations	488	488	488	488

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Sex in the Last 12 Months (Males), adjusting for PTSD with a higher cutoff Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR
Fear	0.4* (0.2 - 0.9)			0.4** (0.2 - 0.6)
Observation		1.3 (0.8 - 2.0)		1.4** (1.1 - 1.8)
Victimization			1.4 (0.8 - 2.4)	1.5 (1.0 - 2.2)
PTSD (higher cutoff)	1.0 (0.6 - 1.5)	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.7)	1.0 (0.6 - 1.7)
Raised by (ref: 2 parents)	1.2 (0.6 - 2.7)	1.3 (0.6 - 2.8)	1.3 (0.6 - 2.8)	1.3 (0.6 - 2.8)
Adult Female Social Support	0.9 (0.5 - 1.6)	1.0 (0.5 - 1.7)	1.0 (0.5 - 1.7)	0.9 (0.6 - 1.5)
Adult Male Social Support	0.8 (0.6 - 1.2)	0.8 (0.5 - 1.2)	0.8 (0.5 - 1.3)	0.8 (0.5 - 1.3)
Age (ref: <17)	4.5*** (3.2 - 6.3)	4.5*** (3.2 - 6.1)	4.4*** (3.1 - 6.3)	4.5*** (3.2 - 6.4)
Drank alcohol last month	7.2*** (5.6 - 9.1)	6.3*** (4.9 - 8.1)	6.4*** (5.0 - 8.3)	6.5*** (5.2 - 8.1)
Believe men should be tough	0.8 (0.4 - 1.6)	0.8 (0.3 - 1.9)	0.8 (0.3 - 2.0)	0.8 (0.3 - 1.8)
Constant	0.3*** (0.2 - 0.4)	0.1*** (0.1 - 0.3)	0.1*** (0.1 - 0.3)	0.2*** (0.1 - 0.4)
Observations	488	488	487	487

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Females), adjusting for PTSD with a higher cutoff Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	0.7 (0.1 - 8.1)			0.8 (0.1 - 9.8)
Observation		0.4 (0.1 - 1.6)		0.5 (0.1 - 2.2)
Victimization			0.7 (0.3 - 1.4)	0.8 (0.4 - 1.6)
PTSD (higher cutoff)	0.9 (0.5 - 1.5)	0.9 (0.4 - 1.9)	0.8 (0.4 - 1.7)	1.0 (0.6 - 1.6)
Raised by (ref: 2 parents)	0.6 (0.1 - 4.7)	0.6 (0.1 - 2.7)	0.6 (0.1 - 3.5)	0.6 (0.1 - 3.7)
Adult Male Social Support	1.2 (0.5 - 2.7)	1.2 (0.6 - 2.4)	1.1 (0.5 - 2.7)	1.2 (0.6 - 2.4)
Age (ref: <17)	3.5 (1.0 - 12.2)	3.8* (1.3 - 11.6)	3.3* (1.1 - 10.1)	3.5* (1.2 - 10.3)
Drank alcohol last month	0.3* (0.1 - 1.0)	0.4* (0.2 - 0.9)	0.3* (0.1 - 1.0)	0.4* (0.1 - 0.9)
Believe men should be tough	1.3 (0.7 - 2.4)	1.2 (0.6 - 2.4)	1.2 (0.5 - 2.8)	1.2 (0.7 - 2.1)
Partner Type	0.2*** (0.1 - 0.3)	0.2*** (0.1 - 0.4)	0.2** (0.1 - 0.4)	0.2*** (0.1 - 0.4)
Constant	3.8 (0.6 - 22.3)	4.6* (1.2 - 17.2)	3.4* (1.2 - 9.8)	5.7* (1.6 - 20.5)
Observations	366	366	366	366

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex (Males), adjusting for PTSD with a higher cutoff Johannesburg Sample, 2013 WAVE Study				
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR
Fear	1.1 (0.5 - 2.3)			1.1 (0.6 - 1.7)
Observation		1.9 (0.5 - 7.5)		2.0 (0.6 - 6.8)
Victimization			0.9 (0.3 - 2.6)	0.8 (0.5 - 1.3)
PTSD (higher cutoff)	0.5* (0.3 - 0.9)	0.4* (0.2 - 0.8)	0.5* (0.3 - 0.9)	0.5* (0.2 - 0.9)
Raised by (ref: 2 parents)	1.2 (0.9 - 1.7)	1.3 (0.9 - 1.8)	1.1 (0.8 - 1.6)	1.2 (0.9 - 1.7)
Adult Male Social Support	2.8** (1.5 - 5.2)	2.7** (1.6 - 4.5)	2.9* (1.4 - 6.4)	2.7** (1.5 - 4.8)
Age (ref: <17)	3.5** (1.5 - 7.9)	3.4** (1.6 - 7.1)	3.6** (1.5 - 8.3)	3.4** (1.6 - 7.0)
Drank alcohol last month	0.8 (0.2 - 2.4)	0.6 (0.3 - 1.4)	0.8 (0.3 - 2.0)	0.7 (0.3 - 1.3)
Believe men should be tough	0.8 (0.6 - 1.0)	0.8 (0.5 - 1.2)	0.8 (0.5 - 1.1)	0.8 (0.5 - 1.3)
Partner Type	1.2 (0.7 - 1.8)	1.2 (0.7 - 2.0)	1.2 (0.8 - 1.8)	1.3 (0.8 - 2.1)
Constant	0.7 (0.1 - 6.9)	0.5 (0.0 - 6.7)	0.7 (0.0 - 10.9)	0.5 (0.0 - 10.7)
Observations	373	373	372	372

95% CI in parentheses

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

Interactive Models with Mental Health

Logistic Regression of Fear, Observation and Victimization on Sex in the Last Year, adjusting for Depression and PTSD with Interactions by City and Depression, by Gender Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR
	Females			Males		
Fear	1.2 (1.0 - 1.5)			0.5** (0.3 - 0.7)		
Observation		2.6*** (1.6 - 4.0)			1.7** (1.3 - 2.2)	
Victimization			1.2 (0.5 - 2.8)			1.6* (1.1 - 2.5)
City	0.7 (0.4 - 1.1)	0.7 (0.5 - 1.1)	0.7 (0.5 - 1.0)	0.3*** (0.1 - 0.5)	0.2*** (0.1 - 0.4)	0.2*** (0.1 - 0.3)
Depression	1.2 (0.6 - 2.2)	1.3 (0.9 - 1.9)	1.2 (0.7 - 2.2)	1.1 (0.3 - 4.2)	0.8 (0.2 - 3.0)	0.8 (0.2 - 3.2)
Depression X City	0.6 (0.3 - 1.2)	0.5* (0.3 - 0.8)	0.6 (0.3 - 1.2)	0.6 (0.2 - 2.5)	0.8 (0.2 - 2.9)	0.8 (0.2 - 2.9)
PTSD	1.9*** (1.4 - 2.6)	1.9*** (1.4 - 2.7)	1.9*** (1.4 - 2.6)	1.4 (0.8 - 2.5)	1.3 (0.8 - 2.1)	1.3 (0.7 - 2.3)
Raised by (ref: 2 parents)	0.5*** (0.4 - 0.7)	0.5*** (0.4 - 0.7)	0.5*** (0.4 - 0.7)	1.1 (0.7 - 1.9)	1.2 (0.7 - 1.9)	1.2 (0.7 - 1.9)
Adult Female Social Support	0.9 (0.6 - 1.4)	0.9 (0.6 - 1.3)	0.9 (0.6 - 1.3)	1.0 (0.5 - 1.8)	0.9 (0.5 - 1.8)	1.0 (0.5 - 1.8)
Adult Male Social Support	1.2 (0.4 - 3.9)	1.4 (0.4 - 4.8)	1.2 (0.4 - 3.8)	1.0 (0.6 - 1.5)	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.7)
Age (ref: <17)	3.0** (1.6 - 5.9)	3.1** (1.6 - 6.1)	3.0** (1.6 - 5.7)	2.8*** (1.8 - 4.3)	2.6*** (1.8 - 3.9)	2.7*** (1.9 - 3.8)
Drank alcohol last month	2.0** (1.2 - 3.2)	1.8* (1.1 - 2.8)	2.0* (1.2 - 3.3)	4.4*** (2.3 - 8.5)	3.8*** (1.9 - 7.8)	4.1*** (2.0 - 8.4)
Believe men should be tough	1.8** (1.3 - 2.5)	1.9** (1.3 - 2.6)	1.8** (1.3 - 2.5)	0.9 (0.6 - 1.5)	1.0 (0.6 - 1.7)	1.0 (0.6 - 1.7)
Constant	0.4** (0.2 - 0.7)	0.3*** (0.1 - 0.5)	0.5* (0.3 - 0.8)	1.8 (0.8 - 3.8)	1.1 (0.4 - 2.8)	1.2 (0.5 - 3.1)
Observations	902	901	902	901	901	900

95% CI in parentheses

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

**Logistic Regression of Fear, Observation and Victimization on Sex in the Last Year, adjusting for Depression and PTSD with Interactions by City and PTSD, by Gender
Baltimore and Johannesburg Samples, 2013 WAVE Study**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR	Sex_L12 aOR
	Females			Males		
Fear	1.3* (1.0 - 1.5)			0.5*** (0.3 - 0.7)		
Observation		2.6*** (1.7 - 3.9)			1.7*** (1.3 - 2.3)	
Victimization			1.2 (0.5 - 2.7)			1.7* (1.1 - 2.7)
City	0.7* (0.6 - 0.9)	0.8* (0.6 - 1.0)	0.7** (0.6 - 0.9)	0.2*** (0.1 - 0.4)	0.2*** (0.1 - 0.3)	0.1*** (0.1 - 0.3)
Depression	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.5)	1.0 (0.6 - 1.5)	0.8 (0.3 - 2.2)	0.7 (0.3 - 1.7)	0.7 (0.2 - 1.8)
PTSD	2.6** (1.4 - 4.6)	2.8*** (1.6 - 4.8)	2.5** (1.4 - 4.5)	1.1 (0.7 - 1.6)	0.8 (0.5 - 1.3)	0.8 (0.5 - 1.3)
PTSD X City	0.5** (0.3 - 0.8)	0.4** (0.3 - 0.7)	0.5* (0.3 - 0.9)	1.6 (0.9 - 2.7)	1.9 (0.9 - 3.8)	2.0 (0.9 - 4.4)
Raised by (ref: 2 parents)	0.5*** (0.4 - 0.7)	0.5*** (0.3 - 0.7)	0.5*** (0.4 - 0.7)	1.2 (0.7 - 2.0)	1.2 (0.8 - 2.0)	1.2 (0.7 - 2.0)
Adult Female Social Support	1.0 (0.7 - 1.5)	1.0 (0.7 - 1.5)	1.0 (0.7 - 1.4)	0.9 (0.5 - 1.8)	0.9 (0.5 - 1.7)	0.9 (0.5 - 1.8)
Adult Male Social Support	1.1 (0.4 - 3.6)	1.2 (0.4 - 4.3)	1.1 (0.4 - 3.5)	1.0 (0.7 - 1.5)	1.0 (0.6 - 1.6)	1.0 (0.6 - 1.7)
Age (ref: <17)	3.1** (1.6 - 6.2)	3.2** (1.6 - 6.4)	3.1** (1.6 - 6.0)	2.8*** (1.8 - 4.3)	2.7*** (1.8 - 3.9)	2.8*** (2.0 - 3.9)
Drank alcohol last month	1.9** (1.2 - 2.9)	1.7* (1.1 - 2.5)	1.9** (1.2 - 3.0)	4.4*** (2.4 - 8.3)	3.9*** (2.0 - 7.6)	4.2*** (2.1 - 8.3)
Believe men should be tough	1.8** (1.3 - 2.5)	1.8** (1.3 - 2.5)	1.7** (1.2 - 2.4)	0.9 (0.6 - 1.5)	1.0 (0.6 - 1.7)	1.0 (0.6 - 1.7)
Constant	0.4*** (0.3 - 0.5)	0.2*** (0.2 - 0.4)	0.4*** (0.3 - 0.6)	2.0 (0.9 - 4.2)	1.2 (0.5 - 2.9)	1.4 (0.6 - 3.2)
Observations	902	901	902	901	901	900

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex, adjusting for Depression and PTSD with Interactions by City and Depression, by Gender Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	(1) Condom Use aOR	(2) Condom Use aOR	(3) Condom Use aOR	(4) Condom Use aOR	(5) Condom Use aOR	(6) Condom Use aOR
	Females			Males		
Fear	0.4 (0.1 - 1.0)			1.0 (0.6 - 1.5)		
Observation		1.0 (0.7 - 1.5)			0.8 (0.4 - 1.8)	
Victimization			1.0 (0.6 - 1.4)			0.7 (0.4 - 1.1)
City	7.3*** (3.9 - 13.6)	7.2*** (4.0 - 13.1)	7.2*** (4.2 - 12.4)	1.8 (0.7 - 5.0)	1.9 (0.7 - 5.1)	2.2 (0.7 - 6.7)
Depression	1.6 (0.9 - 2.8)	1.5* (1.0 - 2.4)	1.6* (1.0 - 2.4)	1.1 (0.6 - 2.1)	1.2 (0.6 - 2.4)	1.2 (0.6 - 2.3)
Depression X City	0.3 (0.1 - 1.0)	0.2* (0.1 - 0.7)	0.2* (0.1 - 0.7)	0.9 (0.3 - 2.6)	0.9 (0.3 - 2.7)	0.9 (0.3 - 2.6)
PTSD	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.5)	0.9 (0.5 - 1.5)	0.6* (0.3 - 1.0)	0.6 (0.3 - 1.0)	0.6 (0.3 - 1.0)
Raised by (ref: 2 parents)	0.9 (0.6 - 1.4)	1.0 (0.6 - 1.7)	1.0 (0.6 - 1.8)	2.0* (1.0 - 3.9)	1.9* (1.0 - 3.7)	1.9 (1.0 - 3.7)
Adult Male Social Support	1.8 (0.8 - 3.9)	1.8 (0.8 - 4.2)	1.8 (0.8 - 4.3)	2.4*** (1.5 - 3.6)	2.3** (1.5 - 3.7)	2.3** (1.4 - 3.7)
Age (ref: <17)	1.6 (0.8 - 3.3)	1.5 (0.6 - 3.5)	1.5 (0.7 - 3.4)	1.0 (0.3 - 3.6)	1.0 (0.3 - 3.6)	1.0 (0.3 - 3.4)
Drank alcohol last month	0.4* (0.2 - 0.9)	0.4* (0.2 - 0.8)	0.4* (0.2 - 0.8)	0.8 (0.5 - 1.5)	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.6)
Believe men should be tough	1.0 (0.6 - 1.6)	1.0 (0.7 - 1.5)	1.0 (0.7 - 1.5)	0.8 (0.5 - 1.2)	0.8 (0.5 - 1.1)	0.8 (0.5 - 1.2)
Partner Type	0.3*** (0.2 - 0.5)	0.3*** (0.2 - 0.4)	0.3*** (0.2 - 0.4)	0.6 (0.3 - 1.4)	0.6 (0.3 - 1.4)	0.7 (0.3 - 1.5)
Constant	1.4 (0.8 - 2.3)	0.7 (0.3 - 1.6)	0.7 (0.3 - 1.4)	0.9 (0.2 - 3.4)	1.0 (0.2 - 5.3)	1.0 (0.3 - 3.5)
Observations	698	698	698	716	717	716

95% CI in parentheses

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

Logistic Regression of Fear, Observation and Victimization on Condom Use at Last Sex, adjusting for Depression and PTSD with Interactions by City and PTSD, by Gender Baltimore and Johannesburg Samples, 2013 WAVE Study						
VARIABLES	(1) Sex_L12 aOR	(2) Sex_L12 aOR	(3) Sex_L12 aOR	(4) Sex_L12 aOR	(5) Sex_L12 aOR	(6) Sex_L12 aOR
	Females			Males		
Fear	0.3* (0.1 - 0.9)			1.0 (0.7 - 1.4)		
Observation		0.9 (0.5 - 1.6)			0.8 (0.4 - 1.7)	
Victimization			0.9 (0.6 - 1.5)			0.7 (0.4 - 1.2)
City	3.1* (1.0 - 9.5)	3.0 (1.0 - 9.3)	3.1* (1.0 - 9.1)	1.9 (0.8 - 4.7)	1.9 (0.8 - 4.6)	2.3 (0.8 - 6.8)
Depression	0.9 (0.5 - 1.7)	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.5)	1.1 (0.8 - 1.4)	1.1 (0.8 - 1.6)	1.1 (0.8 - 1.5)
PTSD	0.6 (0.3 - 1.3)	0.7 (0.4 - 1.3)	0.7 (0.4 - 1.4)	0.6 (0.2 - 1.8)	0.7 (0.2 - 1.9)	0.7 (0.2 - 2.2)
PTSD X City	1.9 (0.6 - 5.8)	1.5 (0.6 - 3.4)	1.4 (0.6 - 3.3)	0.8 (0.2 - 2.9)	0.8 (0.2 - 2.9)	0.7 (0.2 - 2.9)
Raised by (ref: 2 parents)	0.8 (0.5 - 1.4)	0.9 (0.5 - 1.6)	0.9 (0.4 - 1.6)	2.0* (1.0 - 3.8)	1.9* (1.0 - 3.6)	1.9 (1.0 - 3.6)
Adult Male Social Support	1.8 (0.7 - 4.3)	1.8 (0.7 - 4.2)	1.8 (0.7 - 4.3)	2.4*** (1.5 - 3.6)	2.3*** (1.5 - 3.6)	2.3** (1.4 - 3.6)
Age (ref: <17)	1.3 (0.6 - 2.8)	1.3 (0.5 - 3.0)	1.3 (0.6 - 2.9)	1.0 (0.3 - 3.6)	1.0 (0.3 - 3.6)	1.0 (0.3 - 3.4)
Drank alcohol last month	0.5 (0.2 - 1.1)	0.5* (0.3 - 0.9)	0.5* (0.3 - 1.0)	0.8 (0.5 - 1.5)	0.9 (0.5 - 1.6)	0.9 (0.5 - 1.6)
Believe men should be tough	0.9 (0.6 - 1.5)	1.0 (0.6 - 1.5)	1.0 (0.6 - 1.4)	0.8 (0.5 - 1.2)	0.8 (0.5 - 1.1)	0.8 (0.5 - 1.2)
Partner Type	0.3*** (0.2 - 0.5)	0.3*** (0.2 - 0.4)	0.3*** (0.2 - 0.4)	0.6 (0.3 - 1.4)	0.6 (0.3 - 1.4)	0.7 (0.3 - 1.5)
Constant	2.5** (1.4 - 4.4)	1.2 (0.3 - 4.8)	1.1 (0.4 - 3.2)	0.9 (0.2 - 3.5)	1.0 (0.2 - 5.4)	1.0 (0.3 - 3.6)
Observations	902	901	902	901	901	900

95% CI in parentheses

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

HANNAH LANTOS

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EDUCATION

- Johns Hopkins University, Bloomberg School of Public Health** **Baltimore, MD**
- Expected PhD completion, September 2015
 - Department of Population Family and Reproductive Health
 - Dissertation Topic: Violence and sexual risk-taking in Johannesburg and Baltimore Adolescents, the WAVE Study
 - Awarded an NIH Training Grant (T-32) on the study of STIs (PIs: Jacky Jennings and Susan Sherman)
- Harvard University, John F. Kennedy School of Government** **Cambridge, MA**
- MPA in International Development, May 2011
 - Policy Analysis/Thesis: Women's Empowerment and Family Bargaining Models in Northern Mozambique
- Brown University** **Providence, RI**
- BA in (International) Development Studies, May 2006
 - Graduated with honors
 - Honors Thesis: Women's Education and Empowerment in Cairo, Egypt
- American University in Cairo, Study Abroad, August 2004 – June 2005** **Cairo, Egypt**
- Fall Semester, Study Abroad Program
 - Spring Semester, Arabic Language Institute
- Young Judaea Year Course in Israel, August 2001 – June 2002** **Israel**

RESEARCH

- Research Assistant, WAVE Project, Center for Adolescent Health (ongoing)** **Baltimore, MD**
- Worked for Bob Blum, Freya Sonnenstein, Nan Astone, Kristin Mmari, and Beth Marshall
 - Wrote articles on physical environment, mental health, and violence (Summer 2013-2014)
 - Managed data collection for survey (Spring 2013)
 - Conducted pilot data collection for pilot survey (Spring 2013)
 - Wrote first drafts of survey (Spring 2012)
 - Collected validated survey measures for global adolescent health survey (January 2012)
- Research Assistant, FECOND Study (ongoing)** **Baltimore, MD**
- Worked under Caroline Moreau
 - Conducted an analysis of FECOND data for adolescent contraceptive use and switching patterns in 2013-2014
- Research Assistant, International Center for Research on Women (ongoing)** **Washington, DC**
- Worked under Kirsten Stobenau, Jeff Edmeades, and Katherine Fritz
 - Wrote an article on an evaluation of an adolescent sexual and reproductive health and economic empowerment program in Ethiopia (summer/fall 2014)
 - Worked on a report on initiation of sexual activity and teen pregnancy in West and Central Africa (summer 2014)
 - Managed summer intern (summer 2014)
 - Conducted analysis on pregnancy and school drop out in East Africa (spring 2014)
 - Wrote article on alcohol program in Namibia aiming to reduce HIV transmission (fall 2012)
 - Conducted statistical analysis for a paper on fertility intentions and labor force participation in South Africa (summer 2012)
 - Conducted research on program interventions for property rights in East Africa (summer 2012)
- Federal Reviewer for OPA/OASH** **Washington DC**
- Reviewed applications at the state level for Title X grants
 - Reviewed Teen Pregnancy Prevention Program Applications
 - Participated in panel evaluation of above grants with 3-4 other people
- World Bank Consultant** **Washington DC**
- Demographic Analysis of Southern African Healthcare Systems (September 2015)
 - Worked with Shubha Chakravorty at the Adolescent Girl's Initiative (January 2014)
 - Advised on measures for psychosocial scales for impact evaluation surveys as a psychometrics consultant
 - Assisted with data analysis

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- Research Assistant, MacArthur Foundation** **Baltimore, MD**
- Worked for Michelle Hindin (December 2012-December 2013)
 - Assisted with the development of a systematic literature review of evaluations of interventions for adolescent sexual and reproductive health globally
- Research Assistant, Johns Hopkins Children's Center and Adolescent Medicine** **Baltimore, MD**
- Worked for Pamela Matson (summer 2012)
 - Conducted research on daily diaries data about partner concurrency in adolescent sexual relationships
- Research Assistant, UNDP** **Baltimore, MD**
- Worked under Amy Tsui, Gates Institute for Population and Reproductive Health
 - Supported work on a systematic literature review on community health workers and family planning in the developing world (January 2012 – August 2012)
 - Conducted searches, screened for inclusion and exclusion, reviewed paper quality
- Summer Associate, Harvard University Center for International Development** **Cambridge, MA**
- Summer 2011, worked under Jennifer Gala
 - Organized fall student programming
 - Coordinated with undergraduate career center for joint programming
 - Managed annual conference on migration
- Research Assistant, Mossavar-Rahmani Center for Business and Government** **Cambridge, MA**
- Worked with CBG fellow Annmarie Sasaki in 2010
 - Conducted research regarding US immigration, gender, and labor
 - Organized Round Table discussion spring 2011

TEACHING EXPERIENCE

- Teaching Assistant, Sociology of Health and Illness, College at Johns Hopkins University, Department of Sociology and Undergraduate Concentration in Public Health** **Baltimore, MD**
- Professor, Emily Agree
 - Fall Semester 2014, Spring 2015
 - Taught weekly discussion sections on the sociology of health and illness
- Teaching Assistant, Women's Health Policy** **Baltimore, MD**
- Professor, Donna Strobino
 - Fall Semester 2013, Spring Semester, 2014, Fall Semester 2014
- Teaching Assistant, Reproductive and Perinatal Epidemiology** **Baltimore, MD**
- Professors, Donna Strobino and Caroline Moreau
 - Spring 2013
- Teaching Assistant, Demographic Methods for Health** **Baltimore, MD**
- Professor, ME Hughes
 - Fall Semester 2012
- Teaching Assistant, Life Course Perspectives on Health** **Baltimore, MD**
- Professors, Robert Blum and ME Hughes
 - Fall Semester 2012, Fall Semester 2013
- Teaching Assistant, Monitoring and Evaluation** **Baltimore, MD**
- Professor, Kristin Mmari
 - Winter 2013
- Sex Education Instructor at Commodore Rogers Elementary School** **Baltimore, MD**
- Fall Semester, 2011
 - Conducted weekly classes with middle school students on sexual health, sexually transmitted infections, pregnancy, and sexual decision-making.
- Teaching Assistant, Econometrics** **Cambridge, MA**
- Professors, Dan Levy and Chris Barr
 - Fall Semester 2010, Spring Semester 2011
 - Teaching assistant for intro econometrics courses in the MPP Program, Kennedy School

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INTERNATIONAL EXPERIENCE

Volunteer Consultant TechnoServe Mozambique

Maputo, Mozambique

- Summer 2010, Winter 2010/2011
- Designed and implemented a baseline survey on an agro-forestry project and gender qualitative analysis
- Designed and implemented qualitative research program in forestry villages in Lichinga, Mozambique
- Conducted Masters paper research on gender in the forestry industry

Peace Corps – Zambia, Rural Education Development

Mpika, Zambia

- January 2007 – September 2008
- Implemented Ministry of Ed's continuing professional development program for Zambian teachers
- Developed extracurricular activities in Zambian schools
- Worked with local women's group to start small businesses in surrounding villages
- Raised over \$8000 to ship 25,000 books to Zambia
- Elected by peers to be provincial representative on the Volunteer Advisory Committee
- Lived in local conditions in mud hut without running water or electricity and with a bike for daily transport

Ashoka – Youth Venture Summer/Fall Associate

Washington, DC

- Summer/Fall 2006
- Monitored applications and tracked accepted grantees
- Developed marketing materials
- Organized logistics and programming for first annual conference for international staff

Seeds of Peace International Camp

Otisfield, ME

- Participated as an American Delegate in 1999 and 2000
- Counselor, Summers 2003-2005
- Led Group Challenge on ropes course to complement verbal dialogue with physical activities
- Managed bunk and table
- Ran Peer Support Program for 25-30 campers who return for a second year in 2005
- Elected by peers to serve on the Seeds Advisory Committee to communicate with board and organize programming for American "Seeds" and "Seeds" studying in the states.

PUBLICATIONS (accepted and in progress) and CONFERENCE PRESENTATIONS

Published or accepted for publication

Mmari, K, Lantos, H, Blum, R, Brahmhatt, H, Sangowawa, A, Yu, C, and Delany-Moretlwe, S. A Global Study on the Influence of Neighborhood Contextual Factors on Adolescent Health *Journal of Adolescent Health*, Dec. 2014: 55 (6) S13-S20.

Mmari, K, Lantos, H, Brahmhatt, H, Delany-Moretlwe, S, Lou, C, Acharya, R, and Sangowawa, A. How adolescents perceive their communities: a qualitative study that explores the relationship between health and the physical environment. *BMC Public Health* 2014, 14:349

Namy, S., J. Haufiku, H. Shilongo, H. Lantos, and K. Fritz. 2012. Reducing Alcohol-related HIV Risk in Katutura, Namibia: Results from a Multi-level Intervention with Bar Owners, Servers, Patrons and Community Members. Arlington, VA: *USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One*, Task Order 1.

Under Review

- Lantos, H, Moreau, C, and Bajos, N. Determinants and correlates of preventive behaviors at first sex with a first partner and second partner: Analysis of the FECOND Study. Submitted to *The Journal of Adolescent Health* Oct. 15th, 2014.

In-progress

Lantos, H, Brahmhatt, H, Decker, M, Mashimbye, L, Moultrie, H, and Delany-Moretlwe, S. Violence and Depression among Urban Youth in Baltimore and Johannesburg.

- Presented as a Poster at American Public Health Association, November 17th, 2014. New Orleans, Louisiana.
- Will be presented as a Poster at Population Association of American Conference, May 2015

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Lantos, H and Marshall, B. Neighborhoods and Adolescent Sexual Behaviors: Analysis of the WAVE study in East Baltimore.

- Presented as an Oral Presentation at American Public Health Association, November 17th, 2014. New Orleans, Louisiana

Lantos, H and Marshall, B. Neighborhoods and Victimization in the Home, Neighborhood and School: Analysis of the WAVE study in East Baltimore.

- Presented as a Poster at American Public Health Association, November 16th, 2014. New Orleans, Louisiana.

Edmeades, J, Lantos, H, Tessaw, F and Karim, N. Worth the Effort? Combining Sexual and Reproductive Health and Economic Empowerment Programming for Married Adolescent Girls in Amhara, Ethiopia.

- Will be presented as a Poster at Population Association of American Conference, May 2015

Other Conference Presentations

Lantos, H, Moreau, C, and Bajos, N. Predictive Nature of Condom Use in First Relationship with Usage in Second Relationship: Analysis of the FECOND Study.

- Presented as a Featured Poster at the CDC STD Conference, June 9th-11th, 2014. Atlanta, Georgia.

Lantos, H, Moreau, C, and Bajos, N. Determinants and correlates of preventive behaviors at first sex with a first partner and second partner: Analysis of the FECOND Study.

- Presented as an Oral Presentation at the Population Association of America, May 1st, 2014. Boston, Massachusetts.

Mmari, K, Lantos, H, Brahmabhatt, H, Delany-Moretlwe, S, Lou, C, Acharya, R, and Sangowawa, A. Vacant Homes, Overcrowdedness, and Trash: How Youth Perceive Their Communities.

- Presented as an Oral Presentation at the American Public Health Association, Nov. 14th, 2013. Boston, Massachusetts.
- Presented at the Department of Population, Family and Reproductive Health Annual Research Day, April 2013

AWARDS

- Student Representative on the Population, Family and Reproductive Health Admissions Committee
- Reviewer for International Journal of Gynecology and Obstetrics Supplement from the International Conference on Family Planning 2013
- STI NIH Training Grant (T32) – Johns Hopkins University Bloomberg School of Public Health
- Edward J. Dehne Award, Population Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health. March 2015.
- Kann Trowbridge Fund, Population Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health. March 2014.
- Fellowship in Family Planning, Population Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health. March 2013.
- Kann Trowbridge Fund, Population Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health. March 2012.
- Josephine Kohn Endowed Scholarship in Family Planning and Development. Population Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health. March 2011.
- R2P Doctoral Student Publications Initiative – Johns Hopkins University Bloomberg School of Public Health

LANGUAGES

Spanish – high competency; Hebrew – competent; Arabic – low competency; Portuguese – beginner; Bemba - beginner