

The Relationship Between Community Violence and Risky Drug Behavior

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Abstract

The purpose of this study is to explore how variations in a child's environment may moderate the relation between community violence and risky behaviors. As an initial test, the study explores the relation between rural, suburban, and urban communities and drug use at two selection points, 6th and 10th grade. The data indicate that while there are variations in drug use patterns across locations, conditioned by sex and age, in 6th grade, many of these differences disappear 4 years later. However, at both time points, the presence of heavy drug use is limited to a minority of participants, skewing patterns. Follow up work will incorporate variation in community violence into the analyses to see if we can further refine these relations.

The Relationship between Community Violence Across Communities and Risky Behaviors

Recent studies have shown that community violence can have a detrimental impact on children's development, causing increases in both internalizing and externalizing behaviors (Sullivan et al. 2007). Children can respond to experiences of community violence in various ways. Researchers have found main effects as a consequence of community violence such as aggression, PTSD and other psychiatric diagnosis. Community violence, as a term, has room for different interpretations regarding the subjective meaning from the point of view of individuals experiencing potentially negative events. The idea of community violence can have a wide range from homicide, murder, and rape, to robbery or theft.

This study is executed to build on the literature by assessing the connection between community violence in urban, suburban, and rural neighborhoods and patterns of externalizing risk behaviors in children. Although risky behaviors can encompass a wide range of behaviors, this research will focus on drug use, specifically the frequency and the variety of use reported by children. In doing so, this study will leverage the Pennsylvania Youth Survey (PAYS), which surveys children in schools across Pennsylvania every two years on a host of issues that impact the risk for, and emergence of, a number of risky behaviors.

Literature Review

Researchers have aimed to answer the question on how community violence can be detrimental on children's development many times and have received mixed responses. For instance, Lynch and Cicchetti (1998) studied children who experienced maltreatment and investigated subsequent adaptive behaviors. They found no significant increase in externalizing behaviors when community violence was defined as neglect and victimization in the community. In contrast, other researchers have found that community violence can lead to externalizing behaviors such as aggression and drug use. (Farrell and Sullivan 2004). Farrell and Sullivan (2007) studied four middle schools in separate rural counties and found that as all violence increased so did the aggression, especially in the boys. Others, in contrast, concluded that community violence affects internalized behaviors more, given links with post-traumatic stress disorder (PTSD) or depression (Lynch 2003). Overall, there is a big overlap between both externalizing and internalizing behaviors resulting from community violence. McGee and Baker (2003) highlight a study that surveyed approximately 300 African American adolescents and found elevated externalizing and internalizing behaviors as a result of living and experiencing a high level of community violence. Research has also shown that children experiencing a traumatic event before the age of 11 are more likely to experience psychopathology, such as post-traumatic stress disorder (PTSD; McGee and Baker 2003). While a lot has been learned concerning the effects of community violence on developmental outcomes, there is still a door open for more research.

There is a strong need for understanding how community characteristics, in this case, urban, rural and suburban, can have an effect on the impact community violence has on the presence and emergence of risky behaviors. With the escalation of violence including gangs and weapons in urban areas, it is beneficial to know how to intervene. Although typically more rural areas do not experience as much community violence the research is needed to explain the crucial effects it can have on individuals. Learning more about the causes and effects of community violence on diverse individuals in different types of communities will allow us to compare to the general population, with the goal of identifying effective interventions and therapies if needed. Furthermore, knowing the specific implications of geographic area on development will allow professionals to be able to have background knowledge to help access active developmental mechanisms. There is a strong need for this research to better focus on helping the upcoming generations, so they do not experience negative effects from early exposure, or subsequent risky behaviors.

Community Violence

The definition of community violence varies. It can range from something as tragic as homicide to something as minor as fighting. Individuals are impacted by community violence in different ways, which can in turn impact their development across a number of different trajectories. Some children may not experience any emotional effect from experiencing community violence while others can display internalizing and externalizing behaviors. In some communities witnessing or experiencing of violence cannot be avoided.

While community violence is more common in more populated areas of the state, it is still common in more rural areas. Farrell and Bruce (1997) found "In a representative study, 31% of urban 6th grade boys and 14% of girls had had someone threaten to kill them; 42% of boys and 30% of girls had seen someone shot; and nearly all had seen others beaten up, had witnessed arrests, or had heard gun fire, with frequencies ranging from 87 to 96%." (Youngstrom et al., 2003). Philadelphia, an urban city in Pennsylvania, reports 63,597

annual crimes while Centre County, which is rural, averages 725 crimes annually (NeighborhoodScout). Previous data suggest that small rural areas do not demonstrate as much community violence as large urban areas, but you do not find the absence of violence.

Drug Use

The current study will focus on drug use as a potential outcome of exposure to, or experience of, community violence. Within the last few years, the frequency of drug use has increased in the United States. Drug abuse is a problem that people of all ages have, and often first emerges in adolescents. Individuals use drugs as a coping mechanism for a number of social and emotional concerns. This research will focus on drug use as a potential effect of increases in community violence. Drugs can be sorted into seven distinct categories: depressants, stimulants, hallucinogens, dissociative anesthetics, inhalants, cannabis and narcotic analgesics (International Association of Chiefs of Police). In these various categories there are specific drugs such as alcohol, methamphetamine, crack, tobacco, cocaine, heroin and nicotine. Minor drug use can be expected from individuals depending on the environment and peers (Ramirez, 2012).

Adolescents frequently abuse tobacco and alcohol (DrugRehab.com). In the past few years vaping (nicotine) has also increased in frequency. The type of drugs that are available can vary in different communities. The National Drug Intelligence Center reports that Pennsylvania sees high levels of transit of drugs. Furthermore, Philadelphia has the highest transportation of legal and illicit drugs within its boundaries. In Reading, a more rural area of the state reports that the most common drug used is marijuana with smaller amounts of cocaine and heroin (National Drug Intelligence Center 2001). In today's society it is easy for teens to find marijuana, but it might be harder to find methamphetamine. Thus, the category of drug use may strongly impact the eventual developmental outcomes from adolescents. Certain drugs may be more addictive than others leading to different effects for broad patterns of development. This knowledge may help us with the understanding why individuals gravitate toward discrete patterns of drug use behaviors.

County Demographics

The classification of a county as rural, urban or suburban is based on population size. Pennsylvania is a state that is majority rural with a few urban spots, such as Philadelphia or Pittsburgh. The demographics of an urban neighborhood is classified by a city with a population of over 50,000, such as Allegheny county and Dauphin county. Furthermore, in a rural area the demographics are usually marked by populations with less than 50,000 individuals, such as Centre country and Cambria county. In between those two extremes are suburban areas. While these areas can have high populations, they tend not to be as developed as the urban area. Urban areas tend to have a main city and skyscrapers while the suburban is the area around the city which tends to be more residential.

Different counties are important to examine because they might have contrasting outcomes, both due to the everyday experiences of children and the general availability of drugs of abuse. Urban places have high populations which results in high violence, but even smaller populated places have violence. Thus, more populated places might have worse violence but it is possible that these individuals are immune to it so they do not have as many externalizing and internalizing results.

Adolescence

The term *adolescent* is typically used for the developmental window marked by the onset of puberty. The National Center for Biotechnology Information notes that this window includes the ages of 10 and 19 years old. During these years these kids go through many physiologically, socially and emotionally changes. Physiological changes include changes in the hypothalamus pituitary-adrenal axis that shows increased activity, leading to changes in both stress reactivity and basal activity (Gunnar et al., 2009). At the same time, adolescents are typically shifting schools going from middle to high school and friend groups are changing and simply growing as a person. The many changes in the age window may increase the impact of the environment and any negative effects. Finally, adolescence is marked by increases in both psychopathology (Costello et al., 2011) and drug use choosing this age range will allow my team and I to determine if violence can alter development. As an initial test of the relations noted here, I examined the relations between geographic location and drug use across six counties, chosen to represent urban, suburban, and rural areas. Child sex and race was also used to examine variation in patterns of interest. Future work will incorporate more targeted measures of community violence.

Methods

Participants

Pennsylvania Youth Survey (PAYS) is a survey sent out every two years to the students in the 6th, 8th, 10th and 12th grades in Pennsylvania. The participants in the current study are from the 2015 and 2019, using the 6th and 10th grade survey results. Although we cannot match individual children across the two time points, this approach allows us to examine patterns of change within the same cohort of children. The survey is optional but most schools across the state do participate in the survey. Other data used is from City-Data (<http://www.citydata.com>), a website that takes data from government and private sources

Procedure

Participants were asked to complete the survey after receiving consent from their guardian at home. The survey is anonymous, voluntary, and confidential. The survey includes numerous questions that range from the topics of experiences, knowledge, attitudes and behaviors. The survey was given out in the classroom setting. Once completed the school sends them back to the administrators of the survey.

Measures

As an initial test of our research questions, I focused on six counties chosen to represent urban (Alleghany, Philadelphia), suburban (Delaware, Chester), and rural (Centre, Cambria) regions of the state. Within each county we also focused on race and lifetime drug use as our main measures of interest.

6th Grade

County. Children were selected for the analyses based on geographic location. As expected, there was an uneven distribution of respondents across Urban (N=342), Suburban (N=6,646), and Rural (N=1,964) counties.

Sex. Children were asked to report their sex as either male (N=4,399) or female (N=4,260).

Race. Children were asked to report their race across five categories. Based on my initial hypotheses, and the need to simplify the analyses, I focused on the two largest groups completing the survey, white (N=5,309) or African American (N=1,648).

Drug Use. Students (N=8,886) reported if they used substances on “0 Occasions”, “1-2 Occasions”, “3-5 Occasions”, “6-9 Occasions”, “10-19 Occasions”, “20-39 Occasions”, “40+ Occasions”. The noted substances were Beer wine, or hard liquor, marijuana, sniffed or huffed substances, cocaine, crack, heroin, hallucinogens, methamphetamine, Ecstasy, metconazole, steroids, prescription pain relievers, tranquilizers, prescription stimulants, synthetic drugs, and over-the-counter medication. I created a composite score of drug use by averaging across the questions, with higher scores reflecting greater drug use. Scores ranged from 0 to 5.92, with a mean score of 0.03 (SD=0.13). This reflects the very low, and skewed, level of drug use in this cohort. As a result, I created two groups designating children who had never used any of the noted substances (N=7,104) versus children who had ever used any substance (N=1,782).

10th Grade

County. Children were selected for the analyses based on geographic location. As expected, there was an uneven distribution of respondents across Urban (N=2,137), Suburban (N=8,199), and Rural (N=1,665) counties.

Sex. Children were asked to report their sex as either male (N=6,024) or female (N=5,690).

Race. Children were asked to report their race across five categories. Based on my initial hypotheses, and the need to simplify the analyses, I focused on the two largest groups completing the survey, white (N=8,494) or African American (N=1,918).

Drug Use. Students (N=11,829) reported if they used substances on “0 Occasions”, “1-2 Occasions”, “3-5 Occasions”, “6-9 Occasions”, “10-19 Occasions”, “20-39 Occasions”, “40+ Occasions”. The noted substances were Beer, wine, or hard liquor, marijuana, sniffed or huffed substances, cocaine, crack, heroin, hallucinogens, methamphetamine, Ecstasy, metconazole, steroids, prescription pain relievers, tranquilizers, prescription stimulants, synthetic drugs, and over-the-counter medication. I created a composite score of drug use by averaging across the questions, with higher scores reflecting greater drug use. Scores ranged from 0 to 6.00, with a mean score of 0.16 (SD=0.30). While levels of drug use had increased over the course of four years, the distribution was highly skewed. Again, I created two groups designating children who had never used any of the noted substances (N=5,394) versus children who had ever used any substance (N=6,435).

As such, while now the majority of students reported having used these substances, only a small minority were heavy drug users.

Results

Our first step examined the descriptive statistics for the student populations at each grade. This allowed us to characterize patterns of drug use across the urban to rural shift in our data. We then examined variations in drug use across counties overall, and then as a function of either sex or race. Chi-square analyses were used for the categorical drug use variable, when compared to race and location. A paired *t*-test was used to compare drug use category and gender. We then completed a univariate ANOVA to assess the interaction between geographic location, race, and sex to predict the continuous drug use score. The ANOVA was structured as a 3 (County) X 2 (Race) X 2 (Sex) analysis with the continuous score as the dependent variable.

6th Grade—2015 Cohort

As can be noted in Table 1, the majority of data were provided by Suburban students. In addition, as expected the Urban students were more diverse than the other locations, reflecting typical geographic distribution of minoritized populations. Finally, the large majority of students (> 79.6%) reported that they have never used any of the listed substances as 6th graders. We then examined if these patterns varied significantly across our measures of interest.

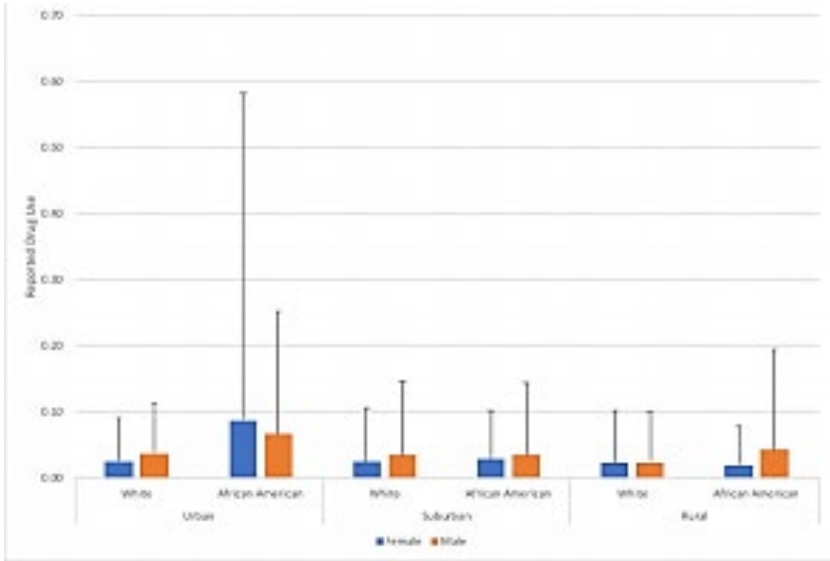
First, for the categorical drug use variable, we found a significant distribution of drug use endorsement across the county categories, $\chi^2(2) = 7.01, p = 0.03$. Although likely driven by the imbalance in the number of participants across locations, there is also the indication that drug use endorsement levels are higher in the Urban counties versus the other two locations. We then completed separate chi-squares per county comparing lifetime drug use and race. The distributions were not significant for the Urban, $\chi^2(1) = 0.05, p = 0.82$, and Rural, $\chi^2(1) = 0.52, p = 0.47$, students. However, for the Suburban students there was a trend such that fewer African American students were less likely to report less drug use (16.1%) than white students (18.5%), $\chi^2(1) = 3.23, p = 0.07$. A similar analysis with sex, found trends in Urban, $\chi^2(1) = 3.04, p = 0.08$, and Suburban, $\chi^2(1) = 24.12, p = 0.001$, counties for greater drug use among males. There was no difference in Rural counties, $\chi^2(1) = 0.07, p = 0.79$.

Second, the univariate ANOVA (Figure 1) found significant main effects for county, $F(2,5887) = 9.71, p < 0.001$, and race, $F(1,5887) = 7.46, p = 0.006$. In addition, there was a significant county by race interaction, $F(2,5887) = 7.63, p < 0.001$. Again, this reflects the uneven distribution of drug use across groups with very low levels of use, and a few children reporting high levels. This can be seen in the large error bars.

Table 1. Distribution of race, sex, and lifetime history of drug use (Yes/No) for the students assessed in grade 6 in 2015.

	Race		Sex		Lifetime Drug Use	
	African American	White	Male	Female	Yes	No
Urban	156 (55.1%)	127 (44.9%)	150 (45.0%)	183 (55.0%)	83 (24.8%)	252 (75.2%)
Suburban	1372 (27.0%)	37142 (73.0%)	3319 (51.5%)	3120 (48.5%)	1347 (20.4%)	5254 (79.6%)
Rural	120 (7.6%)	1468 (92.4%)	930 (49.3%)	957 (50.7%)	352 (18.1%)	1598 (81.9%)

Figure 1. Distribution of drug use score as a function of race, sex, and geographic location in grade 6.



10th Grade—2019 Cohort

As can be noted in Table 2, the majority of data were again provided by Suburban students. Interestingly, there was a marked increase in the number of students from Urban counties, who were overwhelmingly white. Further examination suggests that this resulted from a large increase in Allegheny county. As such, the Urban and Suburban distribution by race was near parity. Finally, there was a shift over the course of the four years in testing, such that just over half of the students, across all counties, reported lifetime drug use as 10th graders. We examined if these patterns varied significantly across our measures of interest.

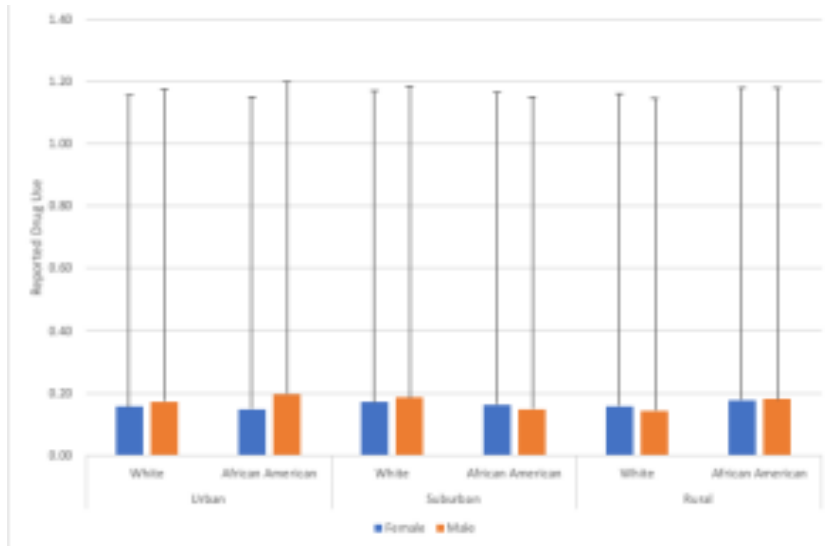
First, for the categorical drug use variable, we found no significant difference in the distribution of drug use endorsement across the county categories, $\chi^2(2) = 1.02, p = 0.60$. It appears that drug use levels have normalized over time. We then completed separate chi-squares per county comparing lifetime drug use and race. The distributions were not significant for the Urban, $\chi^2(1) = 1.45, p = 0.23$, and Rural, $\chi^2(1) = 1.19, p = 0.28$, students. However, for the Suburban students there was again a significant relation, such that fewer African American students were less likely to report less drug use (48.7%) than white students (58.2%), $\chi^2(1) = 35.02, p = 0.001$. A similar analysis with sex, found a trend in Urban, $\chi^2(1) = 2.02, p = 0.16$, and significant in Suburban, $\chi^2(1) = 5.68, p = 0.02$, and Rural, $\chi^2(1) = 5.34, p = 0.02$, counties for greater drug use among males.

Second, the univariate ANOVA (Figure 2) found no significant main effects for county, $F(2,8992) = 0.27, p = 0.77$, and race, $F(1,8992) = 0.43, p = 0.51$. In addition, there was no significant county by race interaction, $F(2,5887) = 1.02, p = 0.36$. Again, this may reflect the fact that drug use has increased and become normalized as students' progress in high school. Yet, it is still rare to see heavy drug use, as noted by the rather large error bars.

Table 2. Distribution of race, sex, and lifetime history of drug use (Yes/No) for the students assessed in grade 10 in 2019.

	Race		Sex		Lifetime Drug Use	
	African American	White	Male	Female	Yes	No
Urban	350 (17.9%)	1600 (82.1%)	1195 (56.8%)	908 (43.2%)	1157 (55.1%)	942 (44.9%)
Suburban	1475 (21.5%)	5395 (78.5%)	3995 (50.1%)	3981 (49.9%)	4374 (54.1%)	3713 (45.9%)
Rural	93 (5.8%)	1499 (94.2%)	834 (51.0%)	801 (49.0%)	904 (55.0%)	739 (45.0%)

Figure 2. Distribution of drug use score as a function of race, sex, and geographic location in Grade 10.



Discussion

This study builds on previous research examining the impact of community violence on adolescents to examine the effect patterns of having internalizing and externalizing behaviors. The specific externalizing behavior examined in this research was drug use. Based on overall statistics, the degree of the violence that these individuals likely experience varies with their geographic location. Generally, urban counties had a higher crime index, followed by suburban and rural counties, which had the lowest crime index in the years of 2015 and 2019. For instance, in 2015 urban areas averaged 27,030 crimes, followed by suburban areas averaging 3,178 crimes, and then rural areas at 874 (Open Data URC – Crimes) Across the cohorts there was a marked increase in drug use. However, only a small fraction of adolescents were heavy drug users. Future research will more directly highlight the change of adolescent drug use with a relation to community violence.

The findings from this research suggest there is an increase in drug use with age. Specifically, the urban areas rose from 24.8% to 55.1% of the participants acknowledging their drugs (Table 1,2). Furthermore, in the suburban areas there was also an increase jumping from 20.4% to 54.1% (Table 1,2). In the previous data, we notice that the rural counties had the biggest increase in drug use. In 2015 for rural areas only 18.1% of the participants reported using drugs while in 2019, drug use jumped up to 55%, more than half of the participants (Table 1,2). Furthermore, in the urban areas there was also an increase in drug use. In parallel, the data suggest shifts in crime in the same regions over this four-year window. In 2015, the 6 selected counties (Allegheny, Philadelphia, Delaware, Chester, Centre and Cambria) had lower crime rates recorded than in the year of 2019. In 2015, the cohorts of urban areas averaged 27,030 crimes annually (Open Data URC – Crimes). However, 2019 statistics show an increase to an average of 37,300 crimes (NeighborhoodScout).

These findings could potentially pair the increase of the drug use in urban areas with the increase in community violence. It is also important to note, however, that one may expect normative increases in drug use between 6th and 10th grades, as children shift from upper elementary/middle school into high school.

Thus, a limitation to the research may be a confounding variable of age that played a part in the increase of drug use. Typically, six graders are not engaging in drug use, but may expect that by tenth grade adolescents tend to start exploring and being influenced by peers' decisions (Steinburg & Monahan, 2007). Moving forward with research on the effect of community violence on externalizing behaviors, especially drug use, we need to research counties at different age points across the same year. In the hope that the different counties will experience different variance of crimes will show a more direct link between the two variables of interest. Therefore, this is a threat to the internal and external validity of the current study.

The results of this study should be interpreted carefully due to several limitations. The main variable of drug use was captured by self-report data and we could see maturation threats in which the participants either under or overestimate their drug use. However, Sullivan et al. (2007) suggest, "studies have revealed that adolescents are typically truthful when completing self-report measures of risk-taking behaviors such as drug use and aggression (e.g., Oetting & Beauvais, 1990). Furthermore, the data could lack reliability in the aspect that students could have moved in and out of the counties which could expose them to other community violence than what the community-level data suggest. We need to acknowledge the limitations so that moving forward in this research topic we know how to administer the research in the future. As we continue to research the impact of community violence on the development of externalizing and internalizing behaviors, we will expand and refine our targets measures of interest. The complex relation of these variables emphasizes the need for further research using stricter designs to identify the exact relation between community violence and externalizing behavior such as drug use.

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