Final Project

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Introduction

The formative years in the lives of many American teenagers take place within the context of public or private school systems. In these contexts, teens are consistently exposed to many opportunities to practice forming and maintaining social relationships. One potential outcome of adolescent social relations is the risk of engaging with delinquency and violence, especially when teens are unsupervised (Haynie & Osgood 2005). In fact, in the United States youth are more than 2.3 times more likely than the general population to be victims (Hanish and Guerra 2000). School-based risk factors for victimization have been studied extensively since data was collected for the 1977 Safe School Study conducted by the National Institute of Education (Van Dorn 2004). Some often-identified correlates of victimization are age, gender, and race which repeatedly show that younger adolescents, males, and people of color are at the greatest risk of physical victimization (Warr, 1993). Sociological research on adolescent crime and delinquency suggests that the social characteristics of an adolescent's community heavily influence the likelihood of that teen's involvement in delinquent behavior and perhaps the likelihood of their victimization (Hanish and Guerra 2000; Schreck, Fisher, and Miller 2004; Mouttapa, Valente, Gallaher, Rohrbach and Unger 2004; Sampson 1984; Moody 2001; Berg, Brunson, and Stewart 2012; Sampson and Groves 1989; Pridemore 2002; Evans and Smokoski 2016; Shaw and Mckay ([1942] 1969); Hirschi 1969; Sutherland and Cressey 1974). Schreck et al. (2004) speculate that research on victimization could benefit from studies emphasizing the peer influences generated by delinquent groups, because delinquency and victimization share many empirical connections. Their study identified peer delinquency as a significant risk factor for violent victimization. Additionally, Hirschi's (1969) theory of social control and Sutherland's (1974) theory of differential association have both empirically verified a connection between social networks and delinquency/crime and have been adapted and replicated by modern sociologists such as Haynie (2001), Matsueda (1982), and Mangino (2009). For example, Haynie (2001) shows that any structural network location that puts one in a position of greater influence within the group amplifies an individual's delinquency above the delinquent content of the peer network. Just as there is a relationship between network position and delinquency, it follows, that there is a likely connection between the social network occupied by an adolescent and his/her chances of becoming a victim. However, the likelihood of victimization compared to the propensity towards delinquency may function differently in terms of causal mechanisms, particularly the mediating effects of the network's structure. I posit that adolescent friendship networks influence how individuals learn behaviors and that the specific behaviors they adopt will either enhance or limit their exposure to violence. Important for this study are instances of serious nonfatal forms of victimization and their relationship to the behavioral norms of the network and whether the influence of these norms on victimization are conditioned by the structural positioning of adolescents within their friendship networks.

Data

Add Health

To test the influence of friendship network content and structure on teen's exposure to violent victimization, this study employs the public use data from the first wave of the National Longitudinal Study of Adolescent to Adult Health (Here after Add Health). The data consists of a nationally representative sample of teens, grades 7 – 12, nested in randomly selected public and private schools throughout the United States in 1994-95. Information on the sample was collected from the respondents, their peers, school administrators, parents, siblings, and romantic partners through an initial in-school survey followed by four in-home interviews.

In-School Surveys

Table 1: Dependent Variable Index

	Proportion	Counts
knife.gun	0.126	814
shot	0.013	84
stabbed	0.049	314
jumped	0.112	722

Note:
N = 3145

Add Health's In-School Questionnaire, a self-administered instrument, was distributed to more than 90,000 students in grades 7 through 12 in an hour-long class period between fall 1994 and spring 1995. The questionnaire consisted of many topics, from education and parental occupation to self-esteem and risk behaviors, but most important to this study was the information collected on student's behaviors and friendships. Respondents were asked to name their five closest female friends and their five closest male friends. In instances where the friendship nominations were members of the same school as the respondent, as more than 80 percent of nominations were, data was also available on the nominees. The Add Health study design makes it possible to reconstruct the social networks of most students. This network information enables researchers to calculate behavioral attributes present in each respondent's own friendship network, such as delinquency, as well as test the structural influences the network may have on behavior or propensity to victimization.

In-Home Interviews

Data from the more in-depth in-home interviews contains sensitive information on the adolescents such as experience with drugs and alcohol and various other risky behaviors such as carrying a weapon. One of the most advantageous components of this in-home method was the use of laptop computers which played prerecorded questions about experiences with victimization. This method of data collection helped to maintain confidentiality on numerous sensitive subjects. These self-reported experiences from the first wave of in-home interviews was used to construct the dependent variable – victim – for this study. The final research sample for the study consisted of 3145 respondents with data from both the in-school and in-home interviews.

Variable Construction

The Dependent Variable: Violent Victimization

The variable victim is a composite indicator of victimization experienced in the twelve months prior to the wave 1 in-home interviews. It takes on the value of 0, if the respondent experienced none of the forms of physical victimization listed in Table 1, or 1 if they have experienced one of the forms at least once in the past year. The variable was designed to measure purely physical manifestations of victimization i.e. being shot, stabbed, jumped, or having a knife or gun pulled on you. Table 2 shows that the victimization variable has a mean of 0.201 and a standard deviation of .401 for the research sample. About 20% of the sample has experienced one of these forms of violence.

Basic Controls

The age of the respondent at the time of the interview, biological sex, and family's annual income are he basic control variables used in the analysis. Literature on victimization claims that younger teens and males have higher risk for victimization. Family income is included in the model to weakly control for the potential influences of socioeconomic status on exposure to violence.

Popularity, Centrality, and Standing out

Being a highly visible member, that is standing out, in a delinquent network is likely to increase one's chances of being seen as a suitable target for victimization. Two variables have been chosen to operationalize this

Table 2: Friendship Network Delinquency Index

Items	Features
Question 1	During the past twelve months, how often did you smoke cigarettes?
Question 2	During the past twelve months, how often did you drink beer, wine, liqour?
Question 3	During the past twelve months, how often did you get drunk?
Question 4	During the past twelve months, how often did you race on a bike, skateboard, roller blades, or in a boat or car?
Question 5	During the past twelve months, how often did you do something dangerous because you were dared to?
Question 6	During the past twelve months, how often did you lie to your parents or guardians?
Question 7	During the past twelve months, how often did you skip school without an excuse?

concept. Popularity is a measure of the number of friendship nominations received by the respondent. The nominations range from 0 to 30 with a mean of 4.551 and a standard deviation of 3.692. When a person receives more friendship nominations it is a stark example of high visibility with in an adolescent's school. The second operationalization of standing out is centrality. Centrality is a measure of the number of links required to link all other peers in the adolescent's friendship network. Centrally situated adolescents stand out because they are a focal node, much of the information flowing through the network flows through members with high centrality scores. The centrality variable is calculated in the Add Health data using Bonacich's formula (Bonacich 1987). Centrality for the research sample ranges from 0 to 4.288 has a mean of 0.792 and a standard deviation of 0.631.

Density and Blending In

The concept of blending in is operationalized by the variable density. A highly dense network is marked by uniformity and a lack of individuality (Bearman, 1991). When there is less individuality, each member stands out less or, in other words, they blend in more. The variable is defined as the number of ties in the adolescent's friendship network divided by the total number of possible ties, and is represented in the research sample as a proportion and ranging from 0 to 1. The mean for the sample is 0.29 with a standard deviation of 0.152.

Weapon Carrying

The variable weapon carry is a binary indicator for carrying a knife, club, or gun on school grounds in the thirty days prior to the wave 1 in-home interviews. It takes on the value of 0, if the respondent has not carried any of these weapons or 1 if they have. Table 2 shows that the weapon carry variable has a mean of 0.058 and a standard deviation of 0.235 for the research sample. About 6% of the sample had carried a weapon to school in the month prior to the in home surveys.

Network Delinquency

The key contextual network variable deals with delinquency within the respondent's peer group. The variable network delinquency is a measure of minor delinquent acts committed by the respondent's ten closest friends in the year prior to taking the in-school surveys. It takes the information given by friends named in the respondents in-school survey and averages their scores to create a delinquency measure. The delinqeuncy information provided for each friend named comes from the qustions in Table 2 which ranged from 0, indicating never having committed the act, to 5, committing the act up to 5 days of the week. The index ranges from 0 to 4.714 with an average score of 1.139 and a standard deviation of 0.587.

Table 3: Descriptive Statistics

	Mean	Stdv	Min	Median	Max
victim	0.201	0.401	0	0.000	1.000
female	0.526	0.499	0	1.000	1.000
age	14.871	1.729	10	15.000	19.000
family.income	47.701	56.355	0	40.000	999.000
weapon.carry	0.058	0.235	0	0.000	1.000
network.delinquency	1.139	0.587	0	1.045	4.714
popularity	4.551	3.692	0	4.000	30.000
centrality	0.792	0.631	0	0.725	4.288
density	29.013	15.206	0	26.190	100.000

Note:
N = 3145

Analytic Strategy

The dependent variable for this paper is dichotomous and therefore, the normal assumptions of ordinary least squared regression cannot be maintained. To compensate, logistic regression analysis, designed to handle dependent variables of this nature, is used to analyze the data. The logistic regression analysis for this project interprets the odds ratios for the independent variables that represent the individual variable's influence on the likelihood of victimization while holding all other variables in the equation constant at their means. The statistical method used in this paper anticipates victimization as the data used to construct the primary independent variables were collected in the first in-school survey while the data used to construct the variable victimization come from the in-home interviews conducted approximately a year after the first wave of in-school surveys were administered.

The priors used in the analysis were chosen for their lack of informativeness. They are very gently regularizing, but will be overwhelmed by even moderate evidence.

To understand the combined effect of network structure and content on victimization interaction terms where added to the logistic regression models and plotted.

Race is omitted from the regression in favor a descriptive analysis. [white logic white methods] (Bonilla-Silva & Zuberi 2008)

Results

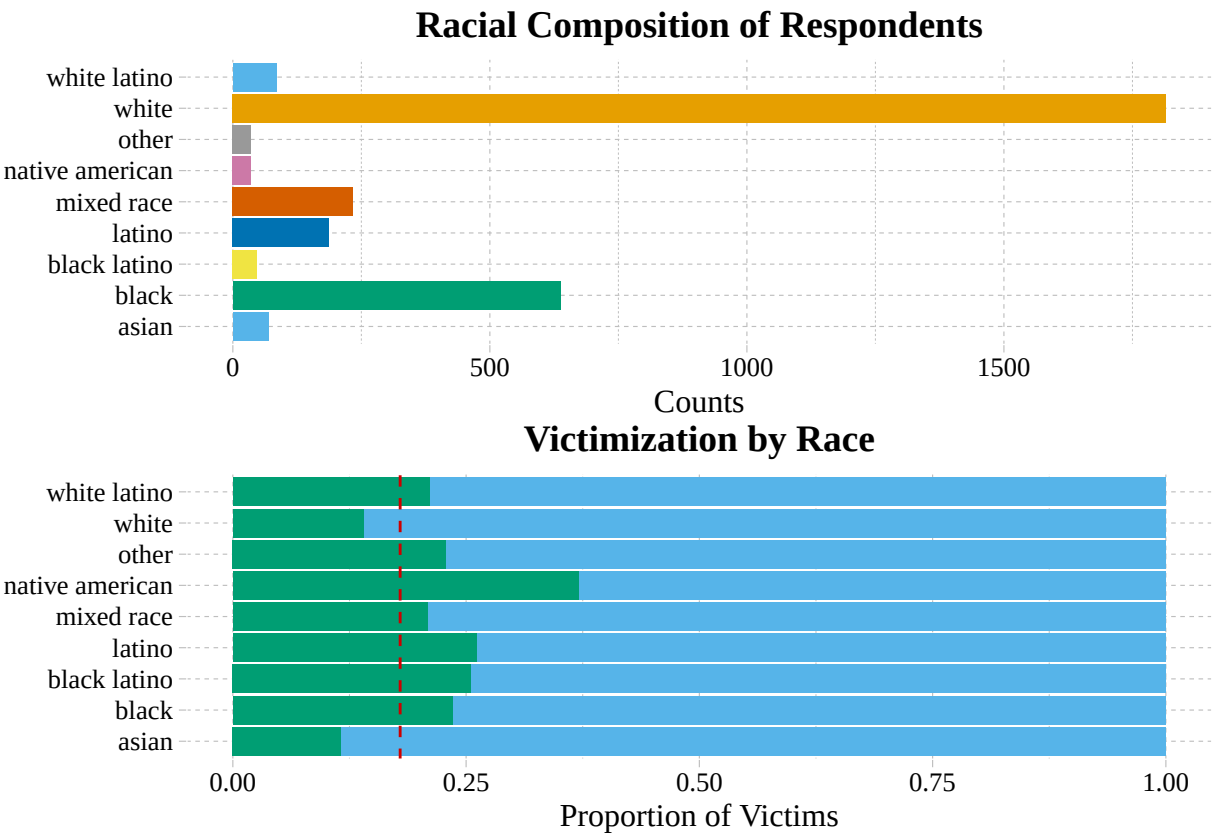

Figure 1

Research suggests that race is a robust determinant of victimization. Van Dorn (2004) states that there are a substantial number of high school students who reported seeing or hearing about racially or religiously motivated confrontations. In fact, 75% of all high school students reported seeing these incidences on a regular basis. What's more, a study by the National School Boards Association (1993) reported that almost 30% of all school violence was related to race and ethnicity (Van Dorn 2004). Hindelang, Gottfredson, and Garofalo (1978) suggest that demographic characteristics (age, gender, income, etc.) are associated with various role expectations, which, in turn, lead to difference in lifestyles, exposure to risk, and subsequently to difference in the likelihood of victimization (Miethe, Stafford, and Long 1987; Haggerty, Skinner, McGlynn-Wright, Catalano, and Crutchfield 2013). Studies of violent victimization among youth have consistently shown that individuals of color, particularly African Americans, are at elevated risk (Hanish and Guerra 2000; Haggerty et al. 2013). Figure 1 shows the racial composition of the complete sample as well as rates of victimization by race. My results show that victimization disproportionally affects people of color particularly native americans. Asian and White adolescents are the only racial categories victimizaed at a lower rate than the sample mean, denoted by the dashed red line.

Regarding the other basic controls, as students age one year their chance of victimization increases by 9%, net of the other variables. Though the literature claims that younger children and males are at greater risk of victimization, as mentioned above, victimization as I have defined it only includes serious nonfatal forms of physical violence. As Model 1 shows, younger children are actually safer than their older counterparts in terms of violence. Also, while considering the included variables, females are 57% less likely than males to be victims of violence, which follows the literature. The family's income also influences victimization. Net of the included variables, every thousand dollar increase in the respondent's family annual income results in a 1% decrease in the likelihood of victimization. For network delinquency, a one unit increase in friends' delinquency results in a 16% increase in the likelihood of ego's victimization. The more central a person is in their network the less likely they are to experience violent victimization; as centrality increases by one

Table 4: Logistic Regression Model

Predictors	Model 1
	OR
Age	1.007
Sex	0.413
Family Income	0.991
Weapon Carry	4.820
Network Delinquency	1.373
Popularity	0.989
Centrality	0.736
Density	0.993
Intercept	0.436

Note:
N = 3145

Table 5: Interaction Models

Predictors	Model 2	Model 3	Model 4
	OR	OR	OR
Age	0.998	0.998	1.002
Sex	0.407	0.407	0.412
Family Income	0.991	0.991	0.991
Weapon Carry	4.680	4.691	4.815
Network Delinquency	1.028	1.020	2.140
Popularity	0.989	0.890	0.989
Centrality	0.393	0.737	0.737
Density	0.993	0.993	1.008
Interaction Term	1.710	1.095	0.987
Intercept	0.705	0.706	0.282

Note:
N = 3145

unit the likelihood of victimization decreases by 25%, while controlling for the other independent variables. Conversely, as the density of the friendship network increases by 1% the likelihood of victimization decreases by 1%.

Models 2, 3, and 4 examine the relationship between the respondent's friendship network delinquency and their victimization and whether it is conditioned by their structural position is within the network. To test this effect, the Models include the cross-product of network structural variables and average network delinquency. In order to interpret the interaction effect of structure and delinquency on victimization I broke up the structural variables in to three categories, high, middle, and low defined by their 10th, 50th, and 90th percentile values respectively. Next, I plotted the predicted probability of victimizartion across the range of network delinquency scores while holding all other included variables at their means, as shown in FIgures 2, 3, and 4. Predicted probabilities were calulated with the inverse link function to convert the original estimates from log odds to probabilities. The interaction effects are now plain to see.

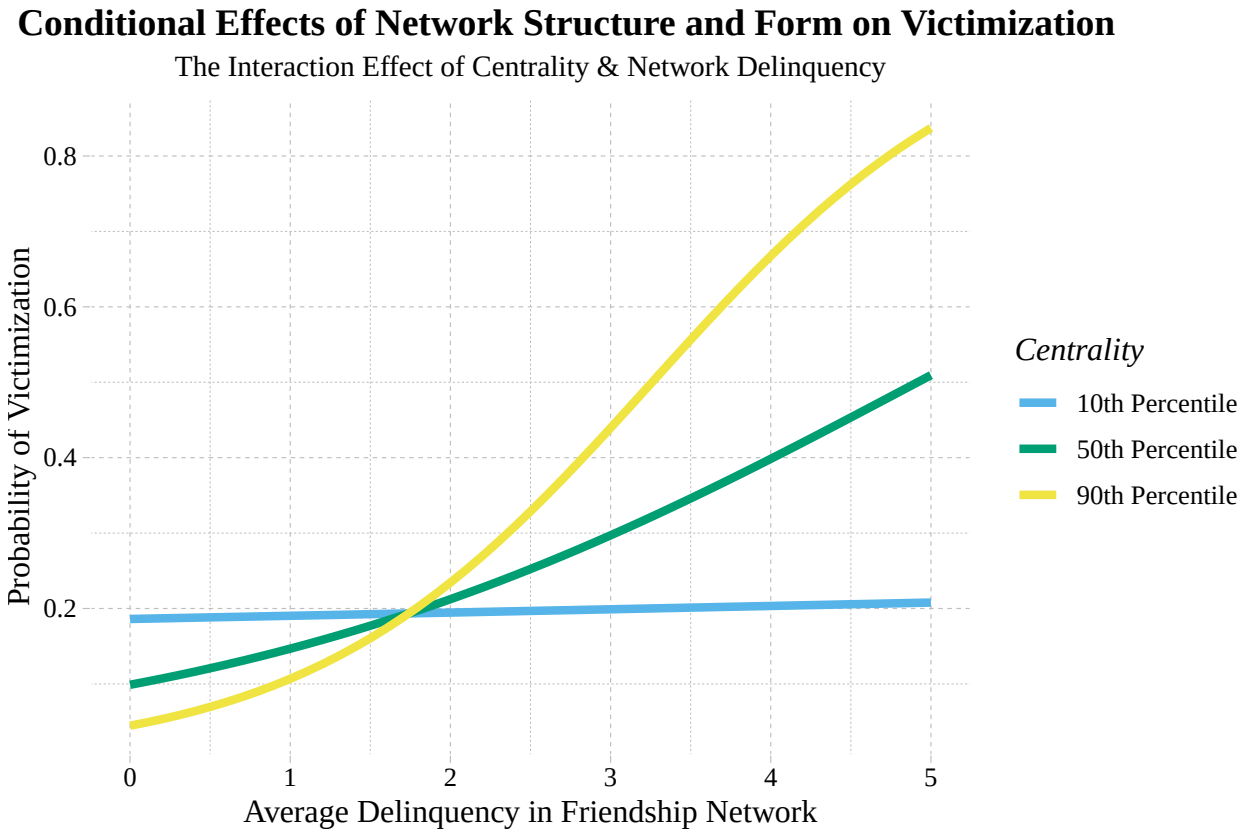

Figure 2

When analyzing respondents who are embedded in highly delinquent networks, the support for the adverse effects of "standing out" become apparent. Given the delinquent network, individuals with high centrality are more likely to become a victim than their low centrality counter parts. That is, standing out in a delinquent network increases one's risk of violent victimization. Figure 1 shows that those adolescents who have high centrality within a highly delinquent network have over an 80% chance of victimization, while those who occupy less prominent positions within equally delinquent networks have much lower likelihoods of victimization. In networks with low delinquency the effects reverse. For respondents whose friendship networks have lower levels of delinquency and who occupy a more central position, the ego's risk of victimization decreases. When the ratio of definitions in an adolescent's friendship network is unfavorable to committing delinquent acts, then the normative social practices of the peer group pull the adolescent further away from situations in which engaging in violence is possible. Figure 1 illustrates this phenomena, as adolescents with high centrality and who occupy non-delinquent networks have less than a 10% chance of becoming victims of violence. To summarize, high centrality "amplifies" the effect of the network's delinquent content on the teens risk of violent victimization. In other words, one does not want to be central in a highly delinquent network.

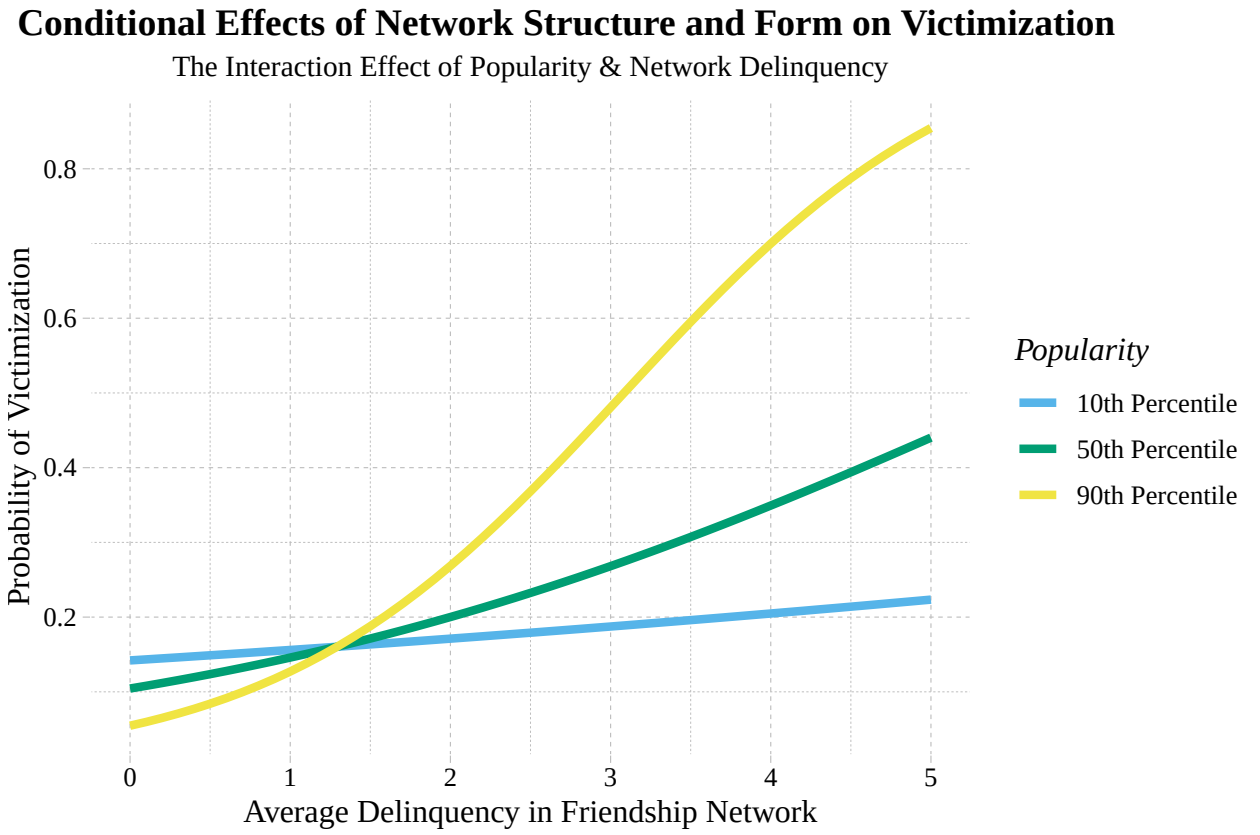

Figure 3

Model 3 inspects the relationship between network delinquency and popularity and their interaction effect on victimization. Nearly identical to the pattern obersved in Figure 2 popularity amplifies the effect of network delinquency on victimization. Increasing popularity while in highly delinquent networks increases victimization. Adolescents who received a greater number of friendship nominations and exist in a highly delinquent network are predicted to have over an 80% chance of victimization. Conversely, those adolescents who received more friendship nominations and who occupied a network with lower levels of delinquency saw the effect reverse; they reported the lowest levels of victimization in the figure at about a 5% chance. Figures 1 and 2 show that centrality and popularity exhibit similar effects on victimization when interacting with network delinquency. Both interaction effects show support for the hypothesis that standing out in a delinquent network increases the odds of becoming a victim.

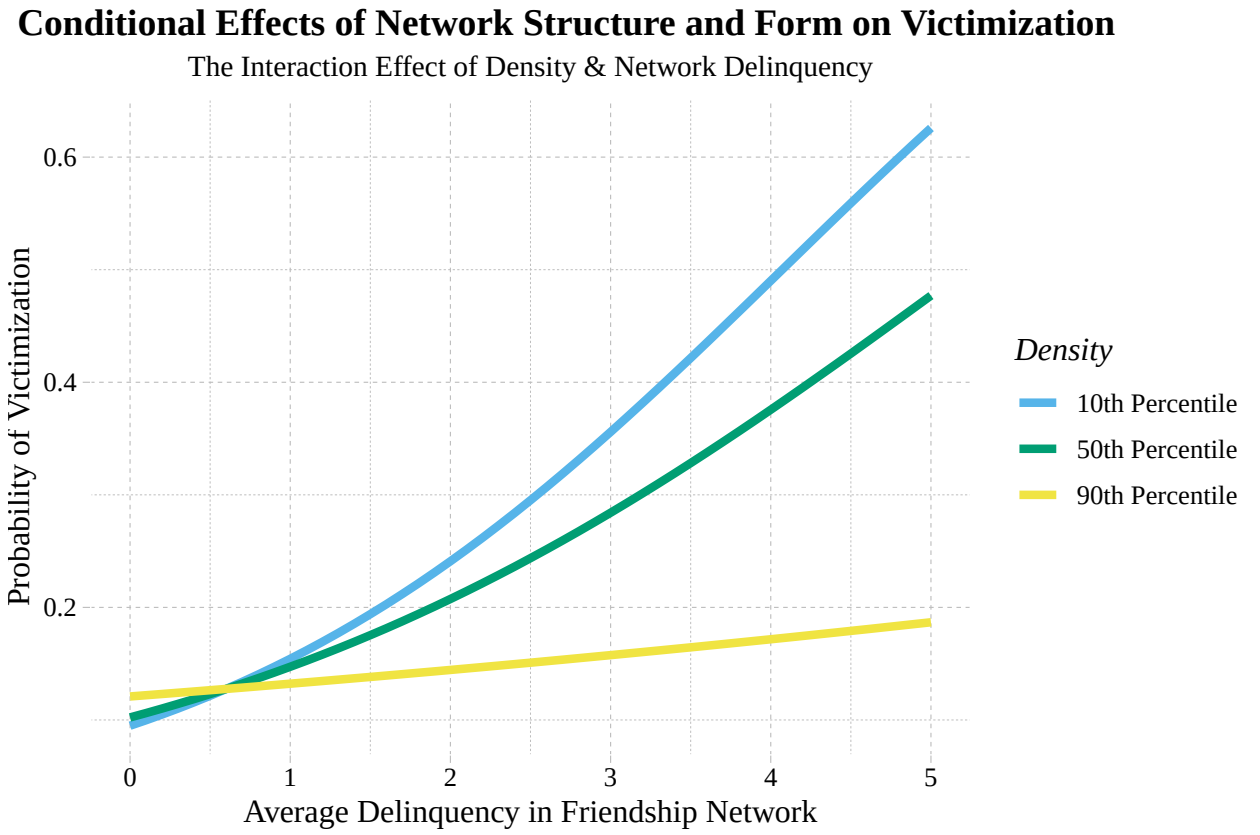

Figure 4

Model 4 tests the "blending in" hypothesis. It explores the interaction effects of the respondent's network density score and the average delinquency of the respondent's closest friends on violent victimization. As Figure 4 shows, in a high delinquency network, increasing density reduces the likelihood of victimization. Adolescents who occupy a highly delinquent network and have higher density scores are predicted to only have less than a 20% chance of being victimized while members of the same delinquent network with lower density have a above a 60% chance. The 90th percentile for density was 0.5 indicating that having half of all possible reciprocal ties in a delinquent network is enough to form a protective shell around an adolescent. Taking the interaction in Figure 3 to its conclusion, in a low delinquency network blending in has less of an effect on an adolescent's propensity to be victimized. Higher density in social networks where the ratio for definitions favor non-delinquent behavior has little effect on the ego's changes of becoming a victim meaning that density does not function to amplify the effects of the network's delinquent content as centrality and popularity do. Instead, the variable density functions to conceal members of delinquent groups and protect them from violence.