Investigating the influence of neighborhood context on levels of violence in Medellín and Chicago

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Abstract

Limited information is available about the ways communities impact violence in developing countries. We tested the association between neighborhood characteristics and violence in Medellín, Colombia, and Chicago, USA, using a household survey of 2494 respondents in 166 neighborhoods in Medellín, and 3094 respondents in 342 neighborhoods in Chicago. In Chicago, poverty and lower collective efficacy are predictive of higher perceptions of violence and rates of homicide. A closer examination by neighborhood poverty however, reveals that levels of perceived violence only differ by levels of collective efficacy in mid-low-poverty neighborhoods. In Medellín, collective efficacy is more pronounced in contexts of high disadvantage, and it is associated, on average, with higher levels of perceived violence and homicide. In both cities, higher levels of collective efficacy in high-poverty neighborhoods are associated with higher homicide. The study questions the notion of "social organization" as a homogeneously beneficial process across cultural and socioeconomic contexts.

Introduction

Urban sociological research has highlighted the pathways through which the socioeconomic environment can affect the systematic distribution of levels of violence. One of the most promising emerging theories linking community processes and crime is collective efficacy theory. This theory critically builds upon social disorganization theory and calls attention to the role that social trust and norms of reciprocity, along with purposive social control, can play as mediators in the association between material deprivation and crime (Galea et al. 2002, Sampson & Groves 1989, Sampson et al. 1999, Sampson et al. 1997). Yet little research has examined the dynamics of neighborhood social environments and their influence on violence outside of Britain and the United States, and even less in developing country contexts (Harpham et al. 2004, Krug 2002, Villarreal & Silva 2006).

This paper explores the generalizability of current theoretical formulations on the relationship between neighborhood social processes and crime to different political and economic contexts. We compare how neighborhood structural characteristics, collective efficacy, and crime are associated in Medellín, Colombia and Chicago, USA. Moreover, we elaborate upon recent extensions and qualifications of collective efficacy theory and investigate whether the impact of collective efficacy on crime is conditional on neighborhood structure, and particularly levels of concentrated disadvantage.

Collective Efficacy Theory: background and existing evidence

Considerable research has focused on the impact that urban contexts have on crime rates. Social disorganization theory constitutes one of the most well-known theories that explain the types of neighborhood conditions that are most conducive to crime. "Social disorganization" refers to the inability of a community to realize the common values of its residents and to maintain effective social controls (Bursik 1988, Sampson & Groves 1989, Shaw & McKay 1972). According to this

theory, neighborhood structural characteristics such as socio-economic disadvantage and residential instability influence patterns of violence by disrupting the level of neighborhood organization (formal or informal), which maintains public order and monitors the activities of residents (Leventhal & Brooks-Gunn 2000, Roosa et al. 2003, Sampson et al. 2002). A meta-analysis of the major criminological theories has found that key elements of social disorganization were among the strongest and most stable predictors of crime rates (Pratt & Cullen 2005).

Social disorganization has been criticized due to its conceptual ambiguity in the definition of social disorganization, and the absence of testable measures of organization (Bursik 1988). The systemic model drew attention to the density and integration of social networks as a source of social control, and helped propel research on social disorganization forward, by making it a more testable theory (Sampson & Groves 1989). More recently however, the central claims that dense social networks are a necessary condition for social control and that social ties are necessarily beneficial, have come under scrutiny (Almgren 2005, Kubrin & Weitzer 2003, Morenoff et al. 2001, Pattillo 1998, Venkatesh 1997). Pattillo, in her ethnography of a low and middle-income neighborhoods in Chicago, for example, proposed that when deviant actors are tightly integrated into local social networks, other residents may be less willing to intervene against them (Pattillo 1998)

Sampson and colleagues (Morenoff et al. 2001, Sampson et al. 1999, Sampson et al. 1997) tried to overcome this and other limitations of social disorganization theory by proposing the concept of collective efficacy. Through this construct, they emphasize that the activation of social ties for the purposes of social control is pivotal to protecting neighborhoods against crime (Sampson 2003, Sampson et al. 1999, Sampson et al. 1997). The theory proposes that weak ties can be equally or even more important than strong ties in protecting neighborhoods against crime, if they help establish norms that residents will act on when they observe deviant activities taking place in their neighborhood (Morenoff et al. 2001, Sampson et al. 1999).

Collective efficacy is defined as social cohesion among neighbors combined with their willingness to intervene on behalf of the common good. It is "*a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments*" (Sampson et al. 1997). Just like self-efficacy is defined as specific to a particular task, collective efficacy exists relative to specific tasks such as maintaining public order. The theory assumes that unlike social ties, social control is unambiguously protective against crime. Collective efficacy was originally measured as a combination of social cohesion and informal social control scales.

Collective efficacy theory has been tested in a limited number of cities. The landmark study by Sampson et al. (1997) in Chicago found that collective efficacy, measured as informal social control and social cohesion and trust, diminished in neighborhoods with higher concentrations of poverty, immigrants and residential instability, as well as in neighborhoods with higher levels of homicide. Collective efficacy was associated with lower perceived levels of neighborhood violence, personal victimization and homicide (Sampson et al. 1997). More recent studies analyzing the association between neighborhood structural conditions and collective efficacy have provided additional support for the theory. Rankin and Quane (2002) built upon the findings by Sampson et al, by studying African-American mothers and up to two of their children in low and mixed-income Chicago neighborhoods. They found that parental monitoring and peer quality, which were associated with problem behaviors, were higher in neighborhoods with greater collective efficacy, net of neighborhood structural characteristics. Simons et al. (2005) conducted a study with an African-American population in Iowa and Georgia and found that neighborhood collective efficacy was concentrated in contexts of high residential stability and low concentrated disadvantage, and it was associated with a lower risk for adolescents of associating with deviant peers. Moren-Cross et al. (2006) studied children's behavioral problems among former Head Start children in third grade

across 13 sites around the nation and reported that worse maternal assessments of collective efficacy were associated with a higher level of children's problem behaviors. Duncan et al. (2003) also confirmed, using a sample from a large metropolitan area in the Northwest, that higher neighborhood violent criminal activity was associated with lower levels of collective efficacy. However, they failed to detect an association between neighborhood demographic indicators and collective efficacy (Duncan et al. 2003), possibly due to the fact that half of the sample who reported on collective efficacy were children, and may thus not have been as aware of neighborhood structural characteristics.

Collective efficacy theory has only been tested once outside the United States. Sampson and Wikstrom (Sampson & Wikstrom 2007 (forthcoming)) found that collective efficacy was comparably concentrated in neighborhoods of low disadvantage in Stockholm and Chicago, and it was also protective against crime in the two settings. Other studies have investigated collective efficacy and its connection to health in European countries. Drukker et al. (2005) conducted a comparative study of Maastricht, Netherlands and Chicago, and found that higher levels of social cohesion and informal social control were found in neighborhoods of lower socioeconomic deprivation, and social cohesion and control were predictive of higher levels of children's perceived health in Maastricht and in the Chicago Hispanic subsample. Skrabski et al. (2004) found that higher income and years of education were negatively correlated with collective efficacy and reciprocity in Hungary. Collective efficacy was predictive of lower rates of middle-age mortality.

Qualifications of Collective Efficacy Theory

Recent studies in the United States and abroad highlight the potential limitations of Collective efficacy theory in its current formulation. The clearest qualification comes from Browning et al. (Browning et al. 2004), who found that the regulatory effects of collective efficacy on violence were reduced in neighborhoods characterized by high levels of reciprocated exchange

and network interaction. They propose an alternative, complementary model to explain contextual influences on urban crime, the negotiated co-existence model. This model posits that network density and reciprocated exchange can both facilitate and compete with collective efforts at social control. Social organization can not only promote expectations for social control of deviant behavior, but it may also provide a source of social capital for offenders who are embedded within the neighborhood social fabric, and may thus limit the capacity of residents to exert effective social control.

This model elaborates on the conceptual decoupling of network density and community action proposed by Sampson and others (Morenoff et al. 2001, Sampson et al. 1999). The study also builds on the ethnographic research of Pattillo and Venkatesh, who found that neighborhood residents were limited in their capacity to control the criminal activity of gangs, given that gangs were inserted within the local social networks and fulfilled public services for the neighborhood (Pattillo 1998, Venkatesh 1997). The findings are consistent with what Portes (1998) describes as "negative social capital", or the use of social boundedness and trust for antisocial ends. Portes describes, for example, the pressure to conform to group norms and the restrictions on individual freedoms, the exploitation of collective closure to place excess claims on group members, and downward leveling norms that are used to keep the members of a downtrodden group in their place and force the more successful members to escape (Portes 1998).

The bulk of recent work focuses on the interaction between collective efficacy and social ties. It remains unclear whether the effect of collective efficacy would also be stronger in more or less disadvantaged neighborhoods. The theoretical formulations proposed by Pattillo and Venkatesh are as much about disadvantage as about the density of network ties: they focused their ethnographic work in highly disadvantaged communities in Chicago and proposed that neighbors have a limited capacity to control criminal groups when they reside in neighborhoods that are

underserved by the state. In such contexts, they may be particularly vulnerable to the service benefits provided by deviant forms of social organization. Prior work has not, however, found any evidence of interactions between collective efficacy and disadvantage in predicting neighborhood crime.

Prior related research presents contradictory evidence on the conditional influence of social processes by levels of economic deprivation. On the one hand, following theoretical formulations proposed by Rutter, and related studies on the conditional influence of parenting and neighborhood socialization at different levels of disadvantage, neighborhoods with the fewest resources may depend more on social processes to control crime (Beyers et al. 2003, Brody et al. 2001, Kawachi et al. 1999, Rutter 1985). On the other hand, greater levels of resource deprivation may undermine the ability of social control to regulate deviant behavior (Brodsky et al. 1999, Caughy et al. 2003, Cohen et al. 2003).

A second notable qualification of Collective Efficacy Theory relates to its generalizability: how specific are the existing findings on collective efficacy to large cities in developed countries? Villareal and Silva raised this concern in reference to the broader spectrum of social organization (Villarreal & Silva 2006). In their study of social cohesion and crime in Belo Horizonte, a major city in Brazil, they argue that the organization of poor urban communities in developing countries may challenge assumptions about the effect of poverty on crime. Villareal and Silva found higher levels of social cohesion in lower-income neighborhoods, which they contend is due to their historical legacy as informal settlements of rural migrants which had to organize in order to gain formal recognition from the state, as well as their dependence on work in the informal sector, which require greater exchange, trust and interaction with neighbors. They also found that social cohesion had no impact on actual levels of crime, but it was associated with a higher perceived risk of victimization. Villareal and Silva argue that people living in more cohesive neighborhoods may

perceive more crime because they are better informed about events in their neighborhood by virtue of their network ties and cohesion amongst neighbors.

Villareal and Silva's findings highlight the key role that the broader political economy may play in the generation of neighborhood dynamics. The larger economic and political context has been neglected by scholars of neighborhoods and crime and by social disorganization theorists (Kubrin & Weitzer 2003). Political and economic decisions may have direct effects on crime, as is the case, for example, when municipal authorities decide to build housing projects, which concentrate poverty and increase levels of residential instability (Kubrin & Weitzer 2003). Economic and political measures may also have indirect effects on crime, by contributing to the deindustrialization of the inner city and thus increasing joblessness and the rise of illegal drug markets in poor neighborhoods (Lee & Ousey 2005, Wilson 1987). Cross-national studies that compare neighborhoods in cities with disparate socio-political profiles can help us understand the role of macro-level forces on neighborhood social organization. Until now however, only one comparative study of collective efficacy and crime has been conducted (Sampson & Wikstrom 2007 (forthcoming)), and none have compared neighborhood dynamics in developed and developing countries.

New contributions to Collective Efficacy Theory

This study builds on current gaps in our understanding of neighborhood collective efficacy and crime. We use a cross-national comparative design to study how differences in urban history, distribution of resources, and societal structure may shape neighborhood social processes. We first examine the structural sources of collective efficacy in two very different socio-political contexts: Chicago, USA and Medellín, Colombia. This investigation extends the work of Villareal and Silva by examining another Latin American city and by moving beyond a focus on social cohesion to investigate the association between disadvantage and both social cohesion and control. This type of

inquiry allows us to actually understand if a different social process is indeed at work in the Latin American urban context since, in contrast with social cohesion, where the evidence is equivocal, previous work in the United States has found a particularly strong association between poverty and social control (Sampson et al. 1999).

Second, we compare the association between collective efficacy and crime in the two cities. We use police data on homicide as our primary measure of neighborhood violence, and then examine whether the same patterns persist when we measure a broader range of violent behaviors through self-reports of perceived crime in the neighborhood, and control for characteristics of neighborhood residents. Such research extends prior work by using both social cohesion and control to predict crime and allows us to test whether activated, purposeful social control has a comparable regulatory impact on violence in a different socio-political context than Chicago.

This study also expands on the work of Browning, and theoretical formulations posed by Venkatesh, Pattillo and others, regarding the potentially conditional nature of collective efficacy (Browning 2002, Pattillo 1998, Venkatesh 1997). We investigate whether the association between collective efficacy and crime is contingent upon the structural characteristics of the neighborhood, in particular the level of concentrated disadvantage. Prior theory suggests that collective efficacy might be less protective in more disadvantaged neighborhoods. If this proves to be true, it is also of particular import to establish whether this finding applies to major cities in both developed and developing countries.

Methods

Data

We analyze data from the Chicago Community Adult Health Study (CCAHS) and the Medellín Study on the Prevalence and Risk Factors for Interpersonal Violence in the Metropolitan

Area. CCAHS was designed to increase understanding of the role of residential context, in conjunction with individual and household factors, in affecting both self-reported and biomedical indicators of adult health, while the Medellín Study was designed to understand the role of neighborhood, family and individual factors in generating risk behaviors, particularly violence.

For the CCAHS, interviews were conducted between May, 2001 and March, 2003, on a probability sample of 3105 adults aged 18 and over, living in the city of Chicago, IL and stratified into 343 neighborhood clusters (NCs) previously defined by the Project on Human Development in Chicago Neighborhoods (PHDCN) (Sampson et al. 1997). One individual was interviewed per household, with a response rate of 71.8 percent, which is quite high for surveys in large urban areas. Each NC usually included two census tracts (roughly 8,000 people) with meaningful physical and social identities and boundaries (Sampson, Raudenbush, & Earls, 1997). Persons in 80 focal areas previously defined by PHDCN were sampled at twice the rate of those in others. The sample contains an average of 9.1 subjects per NC (14.3 per NC in the focal areas and 7.5 per NC in the non-focal areas). All data and analyses are weighted to take account of the different rates of selection (and also different rates of subsampling for final intensive interview completion efforts) as well as household size and differential coverage and nonresponse across NCs, such that the weighted sample matches the 2000 Census population estimates for the city of Chicago in terms of age, race/ethnicity and sex.

For the Medellín Study, interviews were conducted between the end of 2002 to the end of 2003, on a multistage sample of 2500 subjects aged 12-66, living in the city of Medellín, Colombia (Restrepo 2001). One individual was interviewed per household, for a response rate of 90.3%. The sample is self-weighted, since each city block has approximately the same probability of being selected, as well as each person within each city block (Paniagua Suarez & Duque Ramirez 2003). The city blocks sampled made up a total of 172 neighborhoods, and there were an average of 12

respondents per neighborhood. The sample includes respondents from neighborhoods that represent the six socioeconomic strata of the city, although the largest representation is from the lower and middle classes. Five neighborhoods were wrongly classified and were thus removed from the sample; the final sample thus had 166 neighborhoods.

We conducted two types of analyses: first, we estimated the association between neighborhood characteristics and collective efficacy, and then we tested the relationship between collective efficacy and neighborhood violence. Collective efficacy was assessed at the neighborhood level using a revised version of the collective efficacy scale originally used by Sampson et al (1997). The scale consisted of two subscales: social cohesion and social control. The instrument was interviewer-administered and had a fully structured format with a 4-point Likert scale response format. Table 1 in Appendix 1 includes the full set of questions included in the scale, as well as the response options.

Violence was first measured as the homicide rate per 100,000 population in 2003, provided by the Police Department in Chicago and the Office of Public Prosecutor in Medellín. Since we were also interested in investigating whether collective efficacy had an impact on a broader range of violence beyond homicides, we also used a perceived violence scale composed of 6 items that tap into respondent perceptions about the perpetration of violence in the neighborhood in the past 6 months. The questions (see Table 2, Appendix 1) ask about the frequency to which residents estimate selected violent acts occurred in their neighborhoods: except for one question, the scale is identical in the two studies.

Statistical Analysis

The same methods of analysis are applied with the two city samples, simulating a stratified analysis, whereby each country sample represents a "stratum" that is analyzed separately. Given the

differences in measurement in the two studies, we do not attempt to conduct a quantitative comparison of the two samples, but restrict ourselves to qualitative contrasts.

Multiple imputation of missing observations on respondent and neighborhood-level variables was performed through the Sequential Regression Imputation Method, using IVEWARE software (Raghunathan et al. 2001, 2002). We used the analytic software, MPLUS, to combine the model estimates from the five datasets: parameter estimates were averaged over the set of analyses, while standard errors were computed using the average of the squared standard errors over the set of analyses and the between analysis parameter estimate variation (Muthen & Muthen 2005).

Analysis 1: investigating the determinants of collective efficacy

The first part of our analysis consisted of an investigation of the neighborhood predictors of collective efficacy. As we had previously found through exploratory and confirmatory factor analyses that collective efficacy loaded onto two factors at the individual level (social cohesion and social control) and one factor at the neighborhood level (collective efficacy), we needed a model that allowed for a different scale structure at the two levels, and allowed us to account for the within-neighborhood clustering of respondents that violated the assumptions of independent and identically distributed observations. (Hox 1993, Longford & Muthen 1992). We thus used multilevel confirmatory factor analysis (MFLCA), using MPLUS Version 4 software (Muthen & Muthen 2005), to determine the association between neighborhood structural characteristics and collective efficacy, controlling for individual resident characteristics,. Appendix 2 provides statistical background on MLFCA models.

We first estimated unadjusted models in order to obtain an estimate of the reliability of the collective efficacy scale at the respondent and neighborhood levels, as well as the baseline level of neighborhood variability in collective efficacy. Reliability was assessed through the total scale information, which indicates the range of the underlying collective efficacy construct over which

the scale is best at discriminating among individuals or neighborhoods. A second model included a set of individual-level covariates in order to establish whether neighborhood variability in collective efficacy was due to the systematic selection of people into neighborhoods by characteristics that would make them more likely to report high levels of collective efficacy. We then wanted to test how neighborhood structural characteristics related to collective efficacy, net of respondent characteristics. We thus first fit a model adjusting for key structural features, including residential stability and concentrated poverty, and adjusted for population density, which we considered a key demographic confounder. We then incorporated prior neighborhood homicide into the model, in order to establish whether prior levels of violence may be associated with reduced levels of efficacy.

Analysis 2: structural and social neighborhood processes as predictors of violence

After testing the relationship between neighborhood structural characteristics and collective efficacy, we were interested in examining the association between neighborhood structural and social processes and levels of neighborhood violence. We first conducted an ecological analysis using the neighborhood homicide rate as the outcome. We estimated a single-level negative binomial model, which modeled the expected number of homicides in each neighborhood in 2003, and accounted for the skewness of the data. In these models, the collective efficacy measure consisted of a factor score estimated from MLCFA, adjusted for respondent characteristics. We present a model with collective efficacy and neighborhood structural characteristics as predictors, as well as a model controlling for previous levels of homicide: such models allowed us to differentiate the contribution of neighborhood features to the average risk of homicide, in comparison to their influence on the change in homicide over time.

We were also interested in testing whether the same associational patterns between neighborhood features and homicide persisted for a broader range of violent than just homicide. We

thus used a multilevel confirmatory factor analysis model (MLCFA) with the ordinal structure described in Appendix 2, with the perceived violence scale as the outcome. The perceived violence scale items loaded onto one latent factor at the respondent level and one factor at the neighborhood level. Such a model improves upon the linear models estimated by Sampson et al. in the original paper on collective efficacy and violence (1997), since it recognizes the non-linear structure of the ordinal perceived violence items .

We first estimated an unadjusted model to obtain a baseline estimate of the magnitude of variation in the perceived violence scale that takes place at the respondent and neighborhood level. Once the baseline level of respondent- and neighborhood-level variation in the level of perceived violence was established for the two sites, a set of adjusted models were progressively fit to compare the association between neighborhood characteristics and perceived violence in Medellín and Chicago. We first fit a model that included adjustment for individual demographic characteristics, in order to test whether perceptions of neighborhood violence were merely due to a systematic concentration of people into neighborhoods. We then added neighborhood structural characteristics and collective efficacy as key neighborhood predictors of perceived violence. As we were interested in distinguishing the effect of collective efficacy on overall reports of violence vs. on perceptions about violence net of actual neighborhood levels of violence, we fit models with and without adjustment for prior levels of homicide.

After assessing the average relationship between collective efficacy and self-reports on neighborhood violence as well as homicide, we wanted to test whether the effect of collective efficacy on violence was conditional on neighborhood levels of disadvantage. To this end, we created a set of non-parametric "neighborhood typologies", that is, we fit models that contrasted the levels of homicide and perceived violence in neighborhoods with high vs. mid-low levels of collective efficacy and concentrated poverty. Such non-parametric specifications allowed us to

more easily interpret at what levels of disadvantage collective efficacy had the strongest effect on violence, and at what level collective efficacy ceased to be protective.

Neighborhood-Level Variables

In order to characterize the structural features of Medellín and Chicago neighborhoods, we chose variables that would tap into comparable constructs in the two cities. In the case of Medellín, we used three measures of socioeconomic status obtained from the Municipal Office of Urban Planning: mean social class, proportion of residents in poverty (i.e. those in the two lowest social classes) and proportion in public assistance; as well as two variables obtained from the survey on residential stability and neighborhood owner-occupancy. For Chicago, we used 4 variables from 2000 Census that include neighborhood-level measures of socioeconomic status: proportion of residents in poverty and proportion in public assistance; owner-occupied housing and residential stability (please refer to Appendix 1, Table 3 for a list of specific variables). Our aim was to derive a parsimonious and uncorrelated set of factors that capture the two key neighborhood structural measures of interest: concentrated poverty and residential stability. We thus conducted a principal factor analysis with an orthogonal varimax rotation. The two resulting factor scores were standardized to have a mean of zero and a standard deviation of one. The first factor, which we interpret as socioeconomic disadvantage, is characterized by high levels of poverty, low mean social class (in the case of Medellín) and public assistance. The second factor, interpreted as residential stability, is characterized by a high concentration of owner-occupied homes and a higher proportion of residents who have lived in the neighborhood for a period of 5 years or more.

The factors were divided into tertiles for the purposes of model estimation. Such a non-parametric representation of neighborhood characteristics allowed us to detect potential non-linearities in the associations of interest, and made the associations more readily interpretable. We

used the factor tertiles to also create the "neighborhood typologies", which included: 1) neighborhoods with a high level of poverty (those that were on the highest tertile of the distribution on poverty) and a high level of collective efficacy (those on the upper tertile of the collective efficacy distribution); 2) neighborhoods with a high level of poverty and a mid-to-low level of collective efficacy (those on the lower two tertiles of the collective efficacy distribution); 3) neighborhoods with a mid-to-low level of poverty (those on the lower two tertiles of the poverty distribution) and a high level of collective efficacy; and 4) neighborhoods with a mid-to-low level of poverty and collective efficacy.

We were also interested in controlling for certain neighborhood characteristics that are predictive of violence, most notably previous levels of violence and population density. We thus also measured population density as the log of the population density per 100,000 people in the neighborhood, and previous neighborhood violence as the homicide rate in 2000-01 in the neighborhood. The homicide rate was smoothed using the Clayton and Kaldor smoothing function in order to address problems of random variability in the estimates (Clayton & Kaldor 1987, Morenoff et al. 2001, Ostini & Nering 2006, Sampson et al. 1997).

Individual-Level Variables

All multi-level analyses controlled for basic demographic characteristics of neighborhood residents (see specific items in Appendix 1, Table 3). Variables include age, sex, income, education, marital status, home ownership, and number of years of residence in the NC. Race/ethnicity was not included since such data was not collected in the Medellin survey.

Results

The cities of Chicago and Medellín present comparable urban profiles. Medellín had a population of 2.03 million residents in 2002 (Planeacion 2002), while Chicago had a population of

2.9 million people in 2000 (Census 2000a). They are both among the largest cities in their respective countries, with a history as industrial hubs, a high level of residential segregation by level of economic and social disadvantage, and an important problem of violence (Moser & McIlwaine 2000, Naranjo Giraldo 1992, Pattillo 1998, Viviescas M 1989, Wilson 1987).

Sample descriptives

Table 1 presents the descriptive statistics for the Chicago and Medellín samples. The final Chicago sample is composed of 3094 respondents aged 18-92, nested in 342 neighborhoods. The final Medellín sample consists of 2494 aged 12-66 respondents nested in 166 neighborhoods. Overall, the Chicago sample is slightly older than the Medellín sample: respondents are on average 42.5 years of age, while in Medellín, respondents were on average ten years younger (31.9). The Chicago sample also has a larger proportion of married respondents and persons of higher income, while the Medellín sample showed higher levels of residential stability, illustrated by a higher proportion of respondents who owned their residence, as well as higher mean years of residence in the same place.

Neighborhood characteristics also contrast in the two sites: the components of concentrated poverty, percentage of neighborhood residents in poverty and proportion receiving public assistance are higher in Medellín than in Chicago. In Chicago, an average of 20.6% of residents live in poverty and 9.03% receive welfare, while in Medellín, 43.5% of residents are on average in poverty and 35.1% receive public assistance. This is consistent with the contrasting levels of disadvantage in the two cities: official data indicates that Medellín had a poverty rate more than five times higher than that of Chicago in 2000 (58.9% versus 10.5%) (Bernal M. 2005, Census 2000b) and five times the unemployment rate in 1999 (20.3% versus 4.1%) (Census 2000b, Velez 2001).

Neighborhoods in Medellín are on average more stable than in Chicago: while in Chicago an average of 56.2% of residents lived in the same residence for five or more years and 43.7% owned

houses, in Medellín, 72% of residents had lived in the same residence for five years or more, and 52.4% of them owned their residence. Finally, the level of homicide was markedly higher in Medellín: the average homicide per 100,000 persons was 193.9, while it was 14.9 in Chicago.

Table 1 also presents the combinations of collective efficacy and concentrated poverty that exist in the two cities. In Chicago, very few neighborhoods (3% of the sample) show high levels of collective efficacy and high levels of concentrated poverty; high collective efficacy is concentrated in mid-low poverty settings. In Medellín, the opposite occurs: 22% of the neighborhoods are high-poverty and also have high levels of collective efficacy. Even within the mid-low poverty strata, those neighborhoods with high collective efficacy have markedly higher levels of poverty than the mid-low efficacy neighborhoods.

Analysis 1: investigating the determinants of collective efficacy

Before testing the association between neighborhood structural features and collective efficacy, we evaluated whether collective efficacy constituted a cohesive neighborhood-level construct that varied between neighborhoods. The crude model indicated that neighborhood collective efficacy varies between neighborhoods in both cities: while in Medellín the variance component was 0.5, in Chicago it was 0.8.

Despite the neighborhood variation in this construct however, the scale presents low levels of precision at the neighborhood level. Figures 1a-1b in the Appendix 3 present the total scale information curves for the latent mean level of collective efficacy in the neighborhood. At the neighborhood level, both scales have a comparably low level of reliability. To illustrate, the information at the highest level for both Medellín and Chicago is 0.9, which translates into a standard error of estimation 1.0 ($SE(\theta)= 1/\sqrt{I(\theta)}$)—and means that roughly 68 percent of the estimates of collective efficacy will fall between -1.0 and 1.0 (Baker 2001). In Chicago, the scale is

able to measure low levels of collective efficacy with the highest precision, while in Medellín the highest levels of precision are attained at average levels of collective efficacy.

Respondent and neighborhood-level covariates of collective efficacy

Having established that collective efficacy was systematically distributed between neighborhoods, we proceeded to investigate the patterning of collective efficacy by neighborhood structural features. While both cities show a systematic concentration of poverty in certain areas of the city (central and south for Chicago, and north for Medellín), the association between collective efficacy and poverty functions in opposite directions. In Chicago (Figures 1-2), higher levels of collective efficacy are concentrated in neighborhoods of lower concentrated poverty, whereas in Medellín (Figures 3-4), high efficacy neighborhoods have higher levels of concentrated poverty.

Table 2 (Model 2) presents the associations between respondent characteristics and the respondent-level latent factors of social cohesion and social control, as well as the association between structural neighborhood characteristics and the neighborhood-level latent factor of collective efficacy in Chicago. Respondents who owned homes and who were older than 29 years of age were at higher odds of endorsing a higher level of the social cohesion and social control factors, while those with a high level of education (16 years or more) were at lower odds of reporting higher levels of the two factors. In Medellín (Table 3, Model 2), in contrast, those with higher income levels were at higher odds of endorsing higher levels of social control and social cohesion.

As evident in the descriptive data, concentrated poverty showed a contrasting association with neighborhood-level collective efficacy in the two cities: while in Chicago (Table 2, Model 2), neighborhoods in the highest tertile of poverty presented a 0.95-unit lower level of collective efficacy, in Medellín (Table 3, Model 2), neighborhoods in the second tertile of poverty had 0.99 units more of collective efficacy, and neighborhoods in the highest tertile had a level of collective efficacy 1.16 units higher than neighborhoods in the lowest poverty tertile. Homicide was also

predictive of higher levels of collective efficacy in Medellín: those neighborhoods that had homicide levels in the highest tertile of the distribution, had a level of collective efficacy 0.29 units higher.

Analysis 2: structural and social neighborhood processes as predictors of violence

Primary analytic models: ecological analysis of neighborhood homicide rates

The second part of the analysis focuses on a comparison of the association between collective efficacy and crime in the two cities. Tables 4 presents the associations between neighborhood characteristics, as measured in the Chicago and Medellín surveys of 2002 and 2003 and obtained from the Census and municipal registries in 2000-02, and the estimated rate of homicide in the neighborhood in 2003.[1] Table 4, Model 1 indicates that in Chicago, concentrated poverty had a positive association with homicide: neighborhoods in the second tertile of poverty presented a 2.5 times higher risk of homicide than those in the lowest poverty tertile, while those in the highest tertile had 5.84 times higher risk of homicide. Residential stability was also associated with higher rates of homicide: neighborhoods in the highest tertile of stability had 2.36 times more risk of homicide than neighborhoods in the lowest tertile. Collective efficacy was associated with a lower risk for homicide: neighborhoods in the highest tertile of collective efficacy had a 0.46 times lower risk of homicide than neighborhoods in the lowest tertile of efficacy.

Medellín (Table 4, Model 1) presented a comparable, though weaker, association between poverty and homicide: neighborhoods in the second tertile of poverty had 1.7 times higher risk of homicide, while those in the highest tertile had 2.28 times higher risk of homicide than

[1] We estimated models both with (Model 2) and without adjustment for prior levels homicide in the neighborhood (Model 1). However, since adjustment for prior homicide implied estimating the association between neighborhood characteristics and the change in homicide between 2001-2 and 2003, we were concerned that the absence of change over one year would leave very little for the model to explain. We thus decided to interpret the models without prior homicide as our final models.

neighborhoods in the lowest poverty tertile. Collective efficacy was not associated with the rate of homicide.

After testing the association between collective efficacy and homicide in Chicago and Medellín, we investigated whether the effect of efficacy was conditional on neighborhood levels of disadvantage. Figures 5 and 6 present the predicted homicide rate per 100,000 by neighborhood collective efficacy and concentrated poverty levels in the two cities, as estimated from the models presented in Table 5. Figure 5 shows that the association between collective efficacy and homicide in Chicago differs by level of concentrated poverty: while in mid-low poverty neighborhoods, high collective efficacy neighborhoods had lower rates of homicide (although the difference was not significant), in high poverty neighborhoods, the opposite occurred—high collective efficacy neighborhoods had higher rates of homicide. As shown in Figure 6, the same trend occurred in Medellín, although the rates of homicide were markedly higher than in Chicago.

Secondary analytic models: neighborhood characteristics and perceived violence

We were interested in testing whether the same patterns of associations between collective efficacy and homicide persisted for a broader range of violent events. Tables 6 and 7 present the associations between respondent and neighborhood characteristics and levels of perceived violence in the neighborhood in Chicago and Medellín, with and without adjustment for prior levels of homicide in the neighborhood. In these models, the collective efficacy predictor was estimated as a neighborhood-level factor score from an unadjusted multilevel ordinal factor analytic model.

In Chicago (Table 6, Model 2), respondents who had resided in their house for longer or who had a household income lower than $10,000 or between $30-<50,000, were at higher odds of reporting a higher frequency of violent acts in the neighborhood, than those who had resided in their house for a year less or had an income between $10-<30,000. At the same time, respondents who owned their home, were 60 years old or older, had less than 12 years of education or were married,

were at lower odds of reporting a higher frequency of violent acts. In Medellín (Table 7, Model 2), respondent characteristics did not predict the odds of reporting a higher frequency of violent acts, except for being male, which was associated with a 1.18 times higher odds of reporting a higher frequency of violent incidents.

The two cities also showed a contrasting distribution of neighborhood characteristics. In Chicago, Model 2 (Table 6) indicates that homicide was not associated with perceived violence, controlling for concentrated poverty. This null association is probably related to the fact that poverty and homicide are highly collinear in Chicago: they have a correlation of 0.85, controlling for respondent characteristics.[2] As with homicide, concentrated poverty was positively and linearly associated with levels of reported violence: neighborhoods that were on the second tertile of concentrated poverty had a 0.48-unit higher level of perceived violence than neighborhoods in the lowest tertile of poverty, while neighborhoods in the third tertile had a 0.88-unit higher level of perceived violence than those in the lowest tertile. Residential stability was associated with lower levels of perceived violence: neighborhoods that were on the highest tertile of residential stability had a mean level of perceived violence 0.35 units lower than those on the lowest tertile. Finally, collective efficacy exhibited a negative association with perceived violence, independent of actual reported levels of homicide in the neighborhood: neighborhoods that were on the second tertile of the collective efficacy distribution reported 0.43 units less perceived violence, while those on the highest tertile reported 0.65 units less violence than neighborhoods in the lowest tertile of collective efficacy. The magnitude of the association decreased once we controlled for previous rates of homicide, which may indicate that part of the association tapped into a relationship between levels of collective efficacy and actual levels of fatal violence in the neighborhood.

[2] When the association between homicide and perceived violence was estimated without concentrated poverty in the model, we found that a one-unit increase in the homicide rate was associated with a 0.55 unit increase in perceived violence.

Medellín presented contrasting associations between neighborhood characteristics and perceived neighborhood violence to those found in Chicago (Table 7, Model 2). As found in Chicago, concentrated poverty and homicide were associated with higher neighborhood levels of perceived violence. Concentrated poverty presented a relatively linear association with perceived violence: while neighborhoods on the second tertile of the concentrated poverty distribution showed a 0.55-unit higher level of perceived violence than neighborhoods in the lowest tertile, those neighborhoods in the highest tertile of poverty had a level of perceived violence 0.94 units higher than the lowest tertile. In contrast to Chicago, in Medellín collective efficacy also had a positive association with perceived violence: independent of previous rates of homicide, neighborhoods in the highest tertile of collective efficacy presented 0.33 units higher of perceived violence. As in Chicago, the magnitude of the association decreased once we controlled for homicide.

As seen in Table 8 and Figures 7-8, the magnitude of the association between collective efficacy and perceived violence also differs according to levels of poverty in the neighborhood.[3] In Chicago (Figure 7), the protective association of collective efficacy with perceived violence is present only in mid-low concentrated poverty neighborhoods (those in the lowest two tertiles of poverty): high-poverty neighborhoods had higher levels of perceived violence than mid-low poverty neighborhoods, independent of the level of collective efficacy. Collective efficacy also seemed to have a higher impact in mid-low-poverty neighborhoods in Medellin (Figure 8), although in the opposite direction to Chicago. In mid-low-poverty neighborhoods, neighborhoods with high levels of collective efficacy (those in the third tertile of the distribution) had 0.6 higher units of perceived violence than mid-low-efficacy neighborhoods. Among high-poverty neighborhoods, those with high levels of collective efficacy had 0.2 higher units of violence than those with mid-low efficacy.

[3] The figures present the mean predicted neighborhood-level factor score for perceived violence in the different neighborhood types (at low vs high levels of collective efficacy and concentrated poverty), controlling for prior neighborhood homicide, residential stability, population density, and the set of respondent-level characteristics used in the models presented in Tables 6 and 7.

Part of the difference in perceived violence by collective efficacy among mid-low-poverty neighborhoods in Medellín may actually be due to the socioeconomic heterogeneity of the mid-low-poverty group: high-efficacy neighborhoods are markedly higher in concentrated poverty (mean poverty: 0.18), and are composed of residents in the lower-middle class (mean social class: 2.4), while mid-low-efficacy neighborhoods have the lowest levels of poverty (mean poverty: -0.64) in the sample, and are composed of upper-middle to upper-class residents (mean social class: 3.5).

Discussion

Sociologists have expressed a renewed interest in the role that neighborhood contexts play in the proliferation of crime (Sampson et al. 2002). However, much of this research has taken place in the United States and Europe, with little emphasis on the ways residential contexts can contribute to the development of violence in those settings that face the highest burden from such a problem. This study, for the first time, examines the influence of neighborhood economic and social organization on crime in two different cultural and socioeconomic settings, Medellín and Chicago. Such research can function as a first step to delve into the role that the broader political economy can play on neighborhoods, an area that has been neglected in social disorganization research (Kubrin & Weitzer 2003).

This study indicates that collective efficacy theory may have limited generalizability to Latin American urban contexts. Collective efficacy exhibits different relationships with structural neighborhood characteristics in the two cities. Consistent with previous findings on collective efficacy (Morenoff et al. 2001, Sampson et al. 1997), in Chicago lower levels of neighborhood disadvantage were associated with higher levels of efficacy. In Medellín however, collective efficacy was disproportionately concentrated in contexts of higher poverty. Part of the explanation for the Medellín phenomenon fits in with Villareal's theory for the case of Brazil: high levels of collective efficacy in poor neighborhoods may arise from the processes through which low-income

urban neighborhoods develop and subsist in Latin America. Low-income neighborhoods in Medellín, as in Brazilian metropolitan areas, were a destination for rural migrants who settled illegally in the territory. In order to survive, they needed to organize into *"juntas de acción comunal"* (councils of joint action) and advocate for legitimate recognition by the State (Bernal M. 2005, Naranjo Giraldo 1992). This tradition of collective organization continues, as exemplified by the concentration of women's rights organizations in lower-income areas, organized to fill the gaps left by the State in terms of their own health and that of their children (Bernal M. 2005).

An understanding of the relationships between structural and social processes in the Medellín and Chicago neighborhoods provided the basis for investigating how the context may influence crime. In both cities, we found certain commonalities in the associations between local structural characteristics and violence. Consistent with collective efficacy theory, concentrated poverty was positively associated with neighborhood perceived violence and homicide (Bellair 2000, Sampson & Groves 1989, Sampson et al. 1997, Shaw & McKay 1972, Simcha-Fagan & Schwartz 1986). The magnitude of the association with perceived violence was of comparable magnitude in the two cities, indicating that concentration of poverty seems to play a comparable role in promoting perceptions of crime across contexts.

Collective efficacy constitutes the main manifestation of "organization" predicted by current adaptations of collective efficacy theory as a community-level source of control against crime, and a mediator of the impact structural neighborhood characteristics have on violence. As reported in previous research, we found collective efficacy to be protective against homicide and respondent reports of neighborhood violence in Chicago (Bellair 2000, Browning 2002, Cantillon et al. 2003, Elliott et al. 1996, Morenoff et al. 2001, Sampson et al. 1997, Simons et al. 2005). Contrary to findings by Sampson et al. however, collective efficacy does not mediate the association between any of the structural neighborhood characteristics and either homicide or perceived violence.

This study moves beyond an investigation of the average relationship between collective efficacy and crime, and confirms that the impact of collective efficacy in Chicago neighborhoods is indeed contingent on the local socioeconomic context. We found that collective efficacy is associated with lower perceptions of violence in mid-to-low-poverty neighborhoods, but seems to make no difference in high-poverty contexts. In the case of homicide however, this social construct is actually associated with higher rates of homicide in high-poverty neighborhoods. We may conclude that collective efficacy may make a difference on perceptions about violence in settings that are supported by a greater access to material resources, but may have a limited impact on severe types of violence such as homicide. In high-poverty contexts, in contrast, collective efficacy may actually reflect a different form of social organization from that found in lower-poverty neighborhoods.

The distinction between "bridging" and "bonding" social capital proposed by Altschuler et al. (2004), may explain why collective efficacy may have a limited impact on violence in more deprived neighborhoods. Neighbors may organize around the common goal of controlling deviance in the neighborhood, but the lack of connections to influential social networks outside of their immediate circle render them socially isolated and limited in effectiveness (Altschuler et al. 2004). Without access to strategic ties outside the neighborhood, collective community efforts to collaborate and exert social control may not be sufficient to overcome the barriers present in highly disadvantaged communities, ranging from the existence of organized crime, to the lack of legal means to obtain resources, to the absence of a formal police presence (Cardona et al. 2005).

These findings also confirm the proposals put forth by Venkatesh, Pattillo and others, who argue that restricted social ties may be even further limited by the insertion of criminal groups such as gangs into the local social networks. Venkatesh documented in his ethnography of Blackstone, a public housing development in a large Midwestern city, that the dominant street gang began using

their illegal revenues to fulfill a range of community needs, once they "corporatized", or systematized their involvement in drug distribution (Venkatesh 1997). Neighborhood residents had a complex relationship with gang members, as gang members were inserted within residents' social network and provided basic services neglected by official institutions, but they also exposed residents to a high level of community violence. Pattillo and Browning stress the barriers that exist in controlling crime when the sources of crime are tightly integrated into community networks (Browning et al. 2004, Pattillo 1998).

Considering the potentially variable impact of collective efficacy, it is not surprising that in Medellín, where collective efficacy is highly concentrated in more disadvantaged neighborhoods, this social process is, on average, associated with higher levels of perceived violence. A similar phenomenon seems to exist as found in Chicago, but for both perceived violence and homicide: the positive relationship between collective efficacy and violence is particularly marked in higher-poverty contexts.

In Medellín, the negative impact of collective efficacy may reflect a similar, yet more systematic phenomenon as that reported in the United States by Venkatesh, Pattillo and others. High levels of collective efficacy may actually also be tapping into coercive forms of social control exerted not only by gangs but also by a national system of paramilitaries, who concentrate their power in lower-income settings. Paramilitary groups are disproportionately located in lower-class neighborhoods: they are now reported to control almost all of Medellín's slums and the majority of the city's 400 gangs (Ambru 2002). These groups promote community collective activities as well as exert informal social control over minor forms of delinquency. However, this is also at the cost of individual freedoms in the community, as well as an increased probability of exposure to violence, particularly in times of inter-group territorial disputes. This resonates with the notion of "negative social capital" put forth by Portes (1998).

The study is limited by the differences in sampling design and measurement in the two city samples. In Medellín, sampling was not done for the purposes of assessment of neighborhood effects, and thus within-neighborhood samples were often limited in size. Also, the Medellín sample did not include all neighborhoods in the city, and most important, included a reduced number of upper-class neighborhoods. This may have reduced our ability to detect contextual associations. In contrast, in Chicago the sampling strategy was calculated in such a way to ensure maximum reliability of neighborhood-level measures and included a representative number of the whole socioeconomic spectrum. Moreover, some of the measures taken in the two sites differed in terms of the specific question structures. However, we have attempted to ensure maximum comparability in measurement, and have sometimes chosen to use less complex measures in order to incorporate only indicators that existed in both cities.

Both studies also present the limitations inherent to cross-sectional observational studies of neighborhoods. First, they do not allow us to differentiate correlations from causal neighborhood effects, so that it remains a question whether neighborhood characteristics determine violence, or the reverse. We address this to some extent by controlling for homicide rates in the neighborhood in the years prior to the measurement of the exposures, as well as by using structural measures observed in years prior to the study, whenever possible. As observational neighborhood studies, they also present the problem of selection: since neighborhood residence is not random and families, to an extent, choose to live in a neighborhood, we might misestimate neighborhood effects by attributing outcomes to contextual exposures that may actually be due to the individual characteristics of the families in certain neighborhoods.

Despite such limitations, one must consider the value of using available data to understand the nature of the contexts that may give rise to violence in countries that face an important burden of the problem. This constitutes, to the authors' knowledge, the first comparative study of

neighborhood processes between a United States city and a city in a developing country. Moreover, it is one of the first studies to move the understanding of collective efficacy theory forward by testing the function of collective efficacy in different structural contexts.

As stated by Villareal and Silva, the organization of a major urban area in a developing country such as Colombia may challenge classical assumptions about the influence of structural and social characteristics on crime (Villarreal & Silva 2006). In Chicago, consistent with collective efficacy theory, neighborhoods of higher concentrated poverty exhibit lower levels of social organization (i.e. collective efficacy), and concentration of poverty as well as high levels of disorganization are predictive of higher levels of violence. In contrast, in Medellín, high levels of organization, as manifested by collective efficacy, are more present in contexts of high disadvantage, and are associated with higher violence. The study serves to highlight the importance of questioning the notion of "social organization" as a homogeneously beneficial process, and to think about the types of conditions that are necessary for social processes such as collective efficacy to protect residents effectively against crime.

Table 1. Individual and neighborhood characteristics for subjects residing in neighborhoods in Chicago and Medellin

Respondent-level characteristics								
	Chicago (n=3094)				Medellin (n=2494)			
	Mean	*SD*	*Min*	*Max*	*Mean*	*SD*	*Min*	*Max*
Age	42.5	16.5	18	92	31.9	13.8	12	66
Female	60.2		0	100	60.9		0	100
Marital status								
Married	35.1		0	100	27.7		0	100
Separated/divorced	18.8		0	100	7.3		0	100
Single: living with no partner	37.8		0	100	51		0	100
Single: living with a partner					10.5		0	100
Widowed	8.3		0	100	2.7		0	100
Income								
<$10,000	11.7		0	100				
10-<30,000	28.1		0	100				
30-<50,000	18.7		0	100				
50+	22.5		0	100				
<1 minimum salary					22.1		0	100
1-2 minimum salaries					52.9		0	100
2-3 minimum salaries					13		0	100
3-7 minimum salaries					9.6		0	100
7+ minimum salaries					2.3		0	100
Social class					2.8	1.1	1	6
Education								
<12 years	25.6		0	100				
12-15 years	50.6		0	100				
16+ years	23.8		0	100				
Residential stability								
Own house	38.3		0	100	58.4		0	100
Years in residence	9.7	12	0	83	14.3	12.2	0	60

Neighborhood-level characteristics								
	Chicago (n=342)				Medellin (n=166)			
	Mean	*SD*	*Min*	*Max*	*Mean*	*SD*	*Min*	*Max*
Concentration of poverty								
Social class	3.51[1]	1.7	1	6	2.9[2]	1.2	1	6
% in poverty	20.6	13.5	1.8	80.2	43.5	42.4	0	100

% in public assistance	9.03	7.7	0	45.3	35.1	41.9	0	181
Residential stability								
% who own a house	43.7	21.8	1.3	94.2	52.4	50.1	0	100
% who live in same residence last 5 years	56.2	12.1	20.2	83.2	72	16	8.3	100
Homicide rate per 100,000	14.9	8.9	0	60	193.9	249	0	2360
Log of population density per 100,000	-0.51	0.64	-3.8	1.2	-3.8	0.6	-6.2	-2.7
Neighborhood typology								
Mid-low poverty/ mid-low collective efficacy (n=125)					*(n=93)*			
Collective efficacy	-0.23	0.42	-1.53	0.33	-0.55	0.73	-2.2	0.48
Concentrated poverty	-0.47	0.39	-1.47	0.16	-0.71	0.56	-1.85	0.64
Mid-low poverty/ high collective efficacy (n=103)					*(n=18)*			
Collective efficacy	0.81	0.36	0.33	1.87	0.71	0.19	0.51	1.18
Concentrated poverty	-0.72	0.36	-1.42	0.08	0.10	0.53	-0.73	0.72
High poverty/ mid-low collective efficacy (n=103)					*(n=18)*			
Collective efficacy	-0.58	0.55	-2.70	0.32	-0.09	0.63	-1.98	0.51
Concentrated poverty	1.17	0.79	0.16	4.09	1.06	0.29	0.72	1.62
High poverty/ high collective efficacy (n=11)					*(n=37)*			
Collective efficacy	0.53	0.10	0.41	0.68	1.06	0.39	0.53	2.07
Concentrated poverty	1.17	0.77	0.19	2.61	1.23	0.42	0.73	2.21

[1] For Chicago, social class is a factor score constituted from median neighborhood household income, median housing value, proportion of residents who are in professional/ managerial occupations, and average number of people per room per housing unit

[2] For Medellin, social class is a measure developed by municipal authorities, based on direct observation of the physical conditions of housing in the neighborhood, the type of housing, population density, and socioeconomic markers of the local population

Figure 1

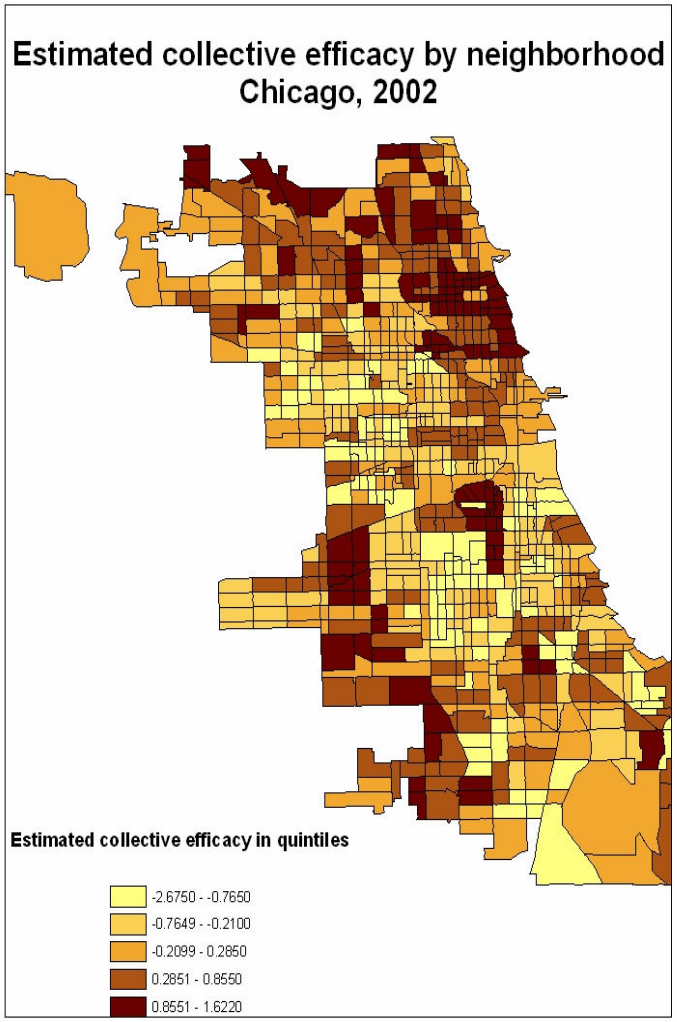
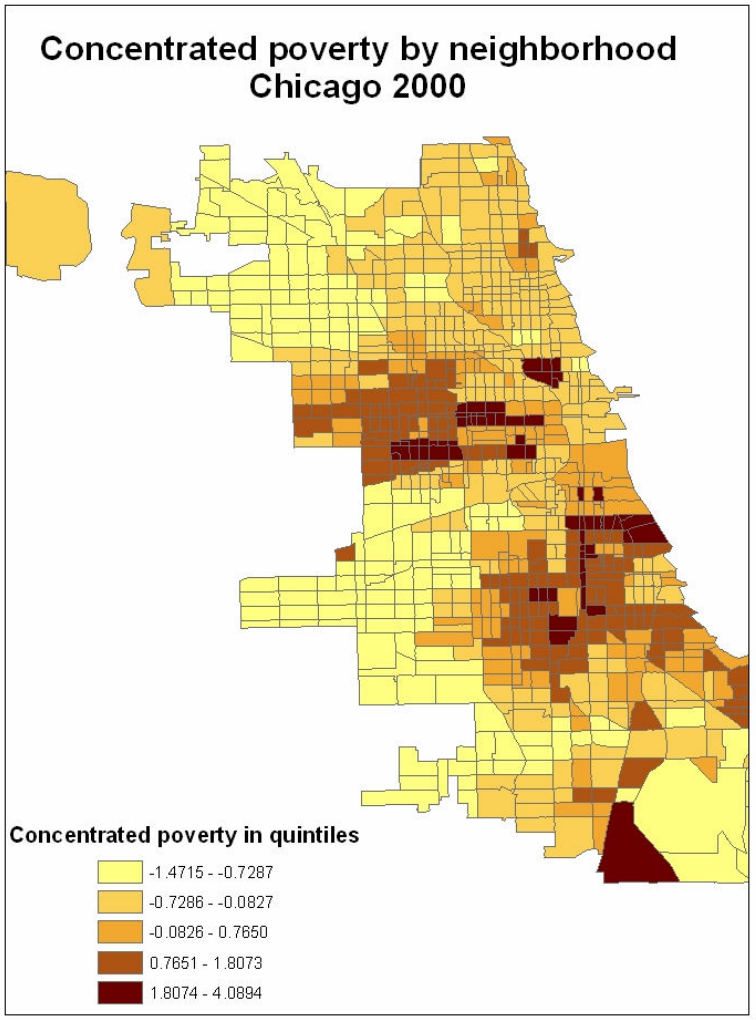


Figure 2



* Collective efficacy consists of the estimated neighborhood factor score for a multilevel factor analysis model, adjusted for resident-level characteristics

Figure 3*

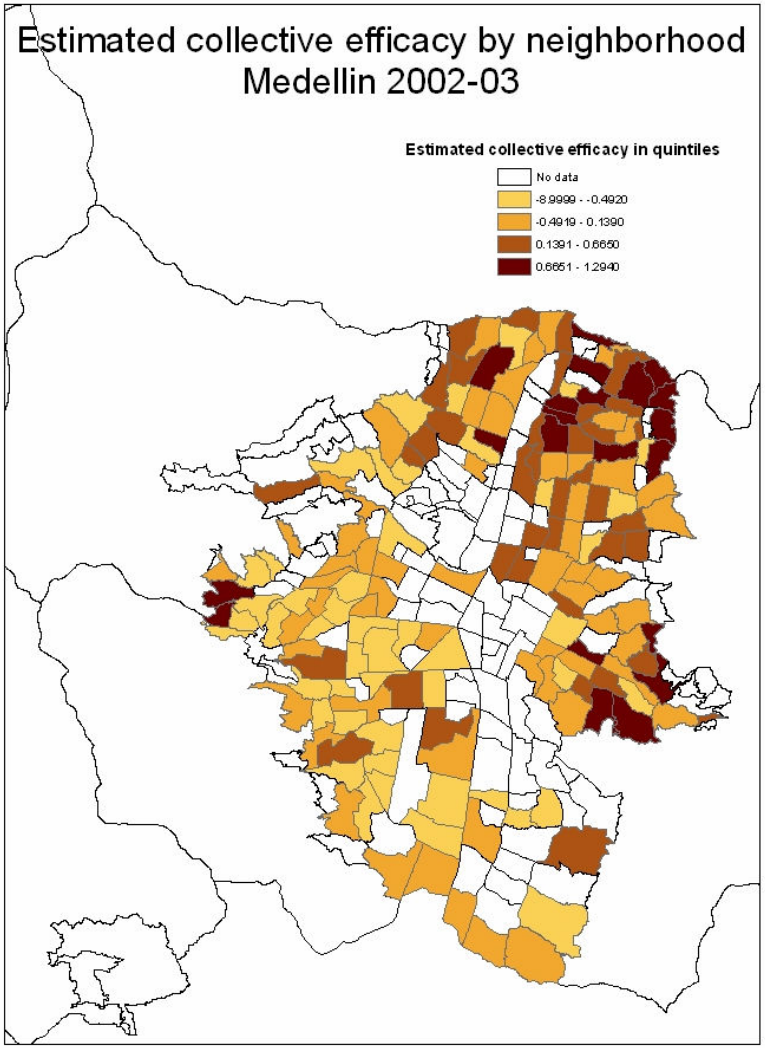
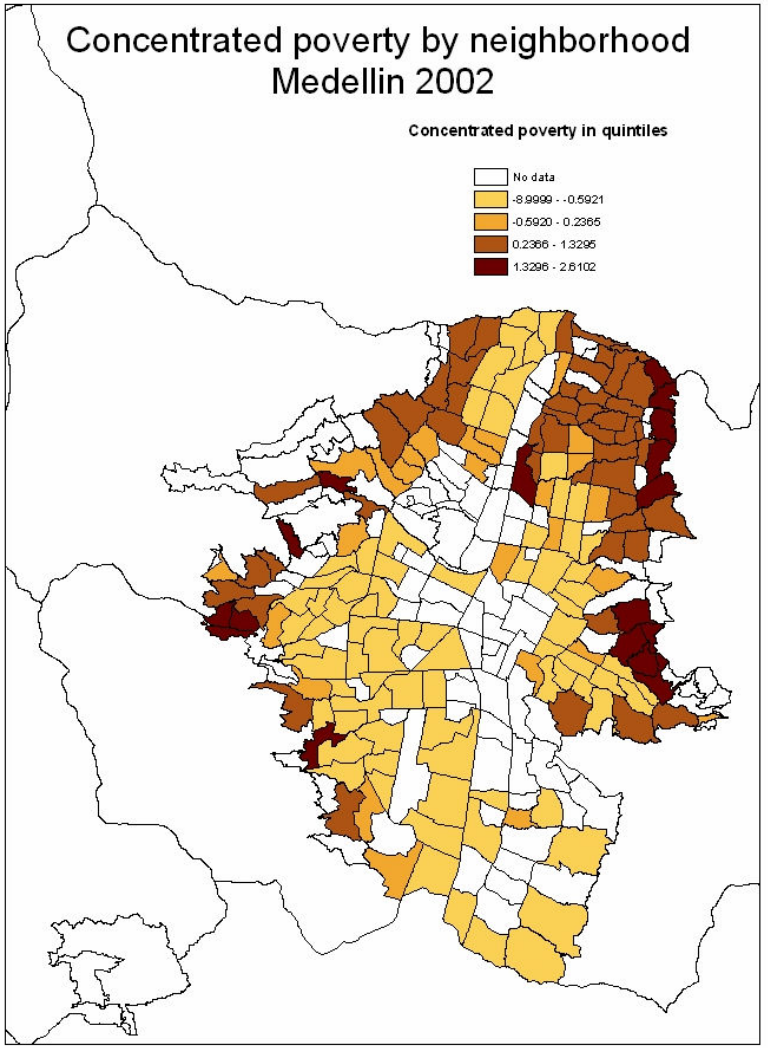


Figure 4



* Collective efficacy consists of the estimated neighborhood factor score for a multilevel factor analysis model, adjusted for resident-level characteristics; non-shaded areas represent neighborhoods not sampled.

Table 2. Multilevel graded response model of respondent predictors of social control and cohesion, and neighborhood-level predictors of collective efficacy

Chicago (n=3094)						
	Model 1: Coefficient (SE)			Model 2: Coefficient (SE)		
	Respondent-level social cohesion factor:	Respondent-level social control factor:	Neighborhood-level collective efficacy factor	Respondent-level social cohesion factor:	Respondent-level social control factor:	Neighborhood-level collective efficacy factor
Years in residence	**0.01 (0.006)**	0.004 (0.004)		**0.01 (0.006)**	0.004 (0.004)	
House owned	**0.43 (0.14)**	**0.26 (0.11)**		**0.44 (0.13)**	**0.26 (0.11)**	
Sex (reference: female)	-0.01 (0.09)	-0.04 (0.07)		-0.01 (0.09)	-0.04 (0.08)	
Age (reference: 18-29)						
30-39	**0.41 (0.13)**	**0.33 (0.11)**		**0.40 (0.13)**	**0.32 (0.11)**	
40-49	**0.68 (0.17)**	**0.56 (0.13)**		**0.67 (0.17)**	**0.56 (0.13)**	
50-59	**0.50 (0.17)**	**0.55 (0.15)**		**0.49 (0.17)**	**0.55 (0.15)**	
60-69	**0.57 (0.20)**	**0.52 (0.17)**		**0.56 (0.20)**	**0.52 (0.17)**	
70+	0.41 (0.24)	0.24 (0.19)		0.39 (0.24)	0.22 (0.2)	
Income (reference: 30-<50,000)						
<$10,000	0.34 (0.19)	0.08 (0.14)		0.35 (0.19)	0.09 (0.14)	
10-<30,000	0.18 (0.14)	0.03 (0.11)		0.19 (0.14)	0.04 (0.11)	
50+	0.21 (0.15)	0.07 (0.11)		0.21 (0.15)	0.07 (0.11)	
Missing	0.07 (0.15)	0.1 (0.12)		0.08 (0.14)	0.10 (0.13)	
Education (reference: 12-15 years)						
<12 years	-0.05 (0.12)	-0.01 (0.1)		-0.05 (0.12)	-0.008 (0.1)	
16+ years	**-0.35 (0.12)**	**-0.24 (0.11)**		**-0.36 (0.12)**	**-0.26 (0.10)**	
Marital status (reference: never married)						
Married	0.22 (0.11)	**0.26 (0.09)**		0.22 (0.11)	**0.26 (0.09)**	
Separated	**0.35 (0.14)**	0.11 (0.12)		**0.36 (0.14)**	0.12 (0.12)	
Widowed	0.17 (0.21)	**0.37 (0.18)**		0.18 (0.21)	**0.38 (0.18)**	
Neighborhood level collective efficacy factor by:						
Concentrated poverty						
Poverty tertile 2			-0.22 (0.13)			-0.16 (0.11)
Poverty tertile 3			**-0.95 (0.30)**			**-0.72 (0.24)**
Residential stability						
Stability tertile 2			0.04 (0.19)			0.06 (0.17)

Stability tertile 3	0.02 (0.28)	0.12 (0.26)
Log of population density (per 100,000)	-0.07 (0.13)	-0.04 (0.12)
Homicide rate per 100,000		
Homicide tertile 2		0.01 (0.32)
Homicide tertile 3		-0.43 (0.28)
Variance		
Within-NC variance: social cohesion	**4.4 (0.5)**	**4.3 (0.5)**
Within-NC variance: social control	**2.5 (0.3)**	**2.5 (0.3)**
Within-NC factor covariance	**2.06 (0.2)**	**2.07 (0.2)**
Between-NC variance: collective efficacy	**0.20 (0.09)**	**0.17 (0.08)**
Model fit		
log likelihood	-26204.2	-26191.3
# parameters	80	82
AIC	52568.5	52546.7

* All significant associations at the $p<0.05$ level are highlighted in bold

Table 3. Multilevel graded response model of respondent predictors of social control and cohesion, and neighborhood-level predictors of collective efficacy

	Medellin (n=2494)					
	Model 1: Coefficient (SE)			Model 2: Coefficient (SE)		
Respondent-level characteristics	Respondent-level social cohesion factor:	Respondent-level social control factor:	Neighborhood-level collective efficacy factor	Respondent-level social cohesion factor:	Respondent-level social control factor:	Neighborhood-level collective efficacy factor
Years in residence	-0.005 (0.005)	0.00 (0.004)		-0.005 (0.005)	0.00 (0.004)	
House owned	0.16 (0.11)	0.06 (0.09)		0.16 (0.11)	0.06 (0.09)	
Male	0.004 (0.11)	-0.16 (0.09)		0.004 (0.11)	-0.16 (0.09)	
Age (reference: 18-29)						
12-17	-0.21 (0.15)	-0.08 (0.13)		-0.21 (0.15)	-0.08 (0.13)	
30-39	0.33 (0.19)	0.21 (0.13)		0.33 (0.19)	0.21 (0.13)	
40-49	**0.41 (0.17)**	0.24 (0.14)		**0.41 (0.17)**	0.24 (0.14)	
50-59	**0.54 (0.23)**	0.22 (0.17)		**0.54 (0.23)**	0.22 (0.17)	
60-66						
Income (reference: 1-2 minimum salaries)						
<1 minimum salary	**-0.33 (0.16)**	-0.13 (0.12)		**-0.33 (0.16)**	-0.13 (0.12)	
2-3 minimum salaries	**0.36 (0.18)**	**0.38 (0.15)**		**0.36 (0.18)**	**0.38 (0.15)**	
3-7 minimum salaries	0.18 (0.23)	0.35 (0.20)		0.18 (0.23)	0.35 (0.20)	
7+ minimum salaries	**0.52 (0.45)**	0.12 (0.28)		**0.52 (0.45)**	0.13 (0.28)	
Social class						
Social class	-0.12 (0.13)	**0.25 (0.11)**		-0.11 (0.13)	**0.25 (0.11)**	
Marital status (reference: never married)						
Married	0.006 (0.15)	0.15 (0.11)		0.006 (0.15)	0.15 (0.11)	
Separated	-0.05 (0.21)	0.13 (0.17)		-0.05 (0.21)	0.13 (0.17)	
Widowed	-0.23 (0.36)	0.02 (0.31)		-0.23 (0.36)	0.02 (0.31)	
Cohabiting	-0.09 (0.17)	0.03 (0.12)		-0.09 (0.17)	0.03 (0.12)	
Neighborhood-level characteristics						
Concentrated poverty						
Poverty tertile 2			**0.66 (0.18)**			**0.61 (0.18)**
Poverty tertile 3			**1.16 (0.2)**			**1.06 (0.21)**

Residential stability		
Stability tertile 2	-0.08 (0.11)	-0.08 (0.11)
Stability tertile 3	0.04 (0.11)	0.07 (0.10)
Log of population density (per 100,000)	-0.03 (0.07)	-0.01 (0.08)
Homicide rate per 100,000		
Homicide tertile 2		0.16 (0.09)
Homicide tertile 3		**0.29 (0.12)**
Variance		
Within-NC variance: social cohesion	**5.3 (0.5)**	**5.3 (0.5)**
Within-NC variance: social control	**2.9 (0.3)**	**2.9 (0.3)**
Within-NC factor covariance	**3.02 (0.3)**	**3.02 (0.3)**
Between-NC variance: collective efficacy	**0.35 (0.16)**	**0.4 (0.2)**
Model fit		
log likelihood	-20466.5	-20465.63
# parameters	78	80
AIC	41088.9	41091.2

* All highlighted estimates are significant at the 0.05 significance level

Table 4. Estimated rate of homicide in 2003 by level of neighborhood characteristics in Chicago and Medellin 2000-2003, as estimated by a single-level negative binomial model#*

	Chicago (n=342 neighborhoods)		Medellin (n=166 neighborhoods)	
	Model 1	Model 2	Model 1	Model 2
	Risk Ratio (95% CI)	Risk Ratio (95% CI)	Risk Ratio (95% CI)	Risk Ratio (95% CI)
Concentrated poverty				
Poverty tertile 2	**2.50 (1.59, 3.92)**	**1.84 (1.22, 2.77)**	**1.70 (1.18,2.44)**	**1.47 (1.06,2.04)**
Poverty tertile 3	**5.84 (3.08,7.59)**	**2.47 (1.62,3.78)**	**2.28 (1.46,3.59)**	**1.74 (1.17,2.57)**
Stability				
Stability tertile 2	1.38 (0.89,2.13)	1.17 (0.80, 1.71)	0.95 (0.68,1.33)	0.90 (0.67,1.21)
Stability tertile 3	**2.36 (1.48,3.78)**	**1.59 (1.05, 2.41)**	0.88 (0.63,1.23)	0.98 (0.74,1.32)
Log of population density (per 100,000)	**1.45 (1.05,1.99)**	1.29 (0.98, 1.69)	**0.49 (0.40,0.60)**	**0.58 (0.49,0.70)**
Homicide rate per 100,000				
Homicide tertile 2		2.10 (0.62,7.09)		**1.49 (1.09,2.03)**
Homicide tertile 3		**9.42 (2.76,32.17)**		**3.19 (2.30,4.41)**
Collective efficacy				
Collective efficacy tertile 2	0.74 (0.51,1.08)	0.98 (0.71,1.34)	1.17 (0.82,1.66)	1.03 (0.76,1.42)
Collective efficacy tertile 3	**0.46 (0.29,0.72)**	0.81 (0.54,1.22)	1.31 (0.83,2.07)	0.99 (0.67,1.48)
Model fit				
Log likelihood	-235.6	-197.1	1582.7	1604.9
Number of parameters	9	11	9	11

Collective efficacy is an estimated factor score extracted from a separate measurement model, which included adjustment for characteristics of the neighborhood residents, including age, length of neighborhood residence, sex, marital status, income, education (Chicago), social class (Medellín), and home ownership.

* Significant associations at $p<0.05$ are highlighted in bold

Table 5. Estimated log-linear association between neighborhood typologies of collective efficacy and concentrated poverty, and the homicide count per 100,000 persons in 2003 in the neighborhood

	Chicago		Medellin	
	Model 1*		Model 1*	
	RR	95% CI	RR	95% CI
Collective efficacy/concentrated poverty (reference: mid-low collective efficacy/mid-low concentrated poverty)				
Mid-low collective efficacy/ High concentrated poverty	**2.84**	**1.86,4.34**	1.24	0.80,1.92
High collective efficacy/ Mid-low concentrated poverty	0.61	0.37,0.99	0.92	0.57,1.49
High collective efficacy/ High concentrated poverty	**3.32**	**1.68,6.53**	**2.38**	**1.69,3.34**

* Model includes adjustment for: length of residence in neighborhood, sex, age, income, social class (Medellín) or education (Chicago), marital status, home ownership, residential stability in neighborhood, and the log of neighborhood density per 100,000

Figure 5. Predicted homicide rate per 100,000 population by neighborhood poverty and collective efficacy, in neighborhoods of mid stability and average population density, Chicago 2003

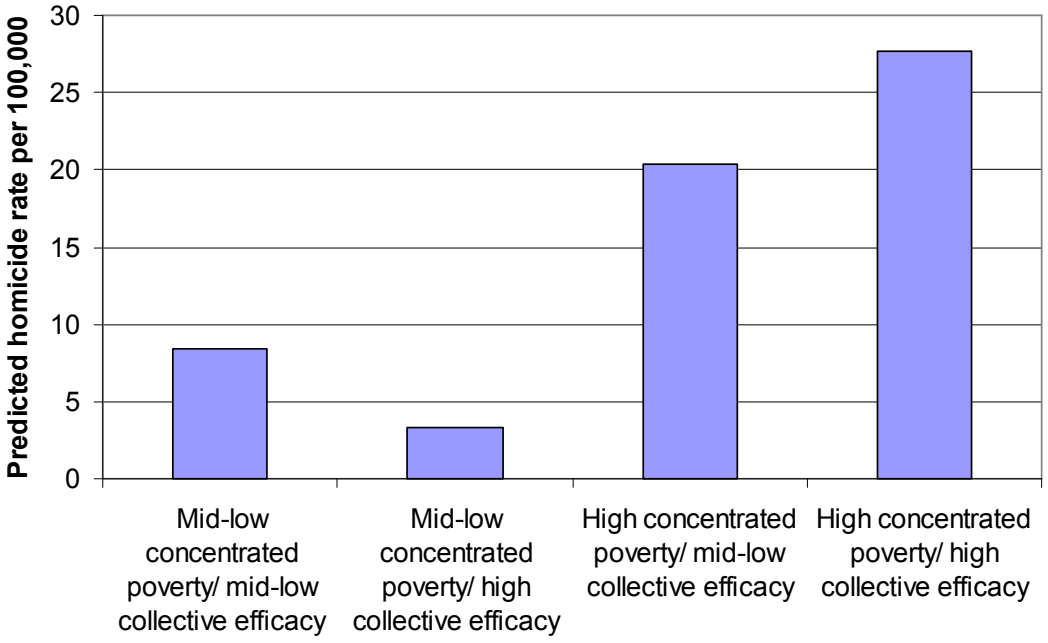


Figure 6. Predicted homicide rate per 100,000 population by neighborhood poverty and collective efficacy in Medellin neighborhoods of mid stability and average population density, 2003

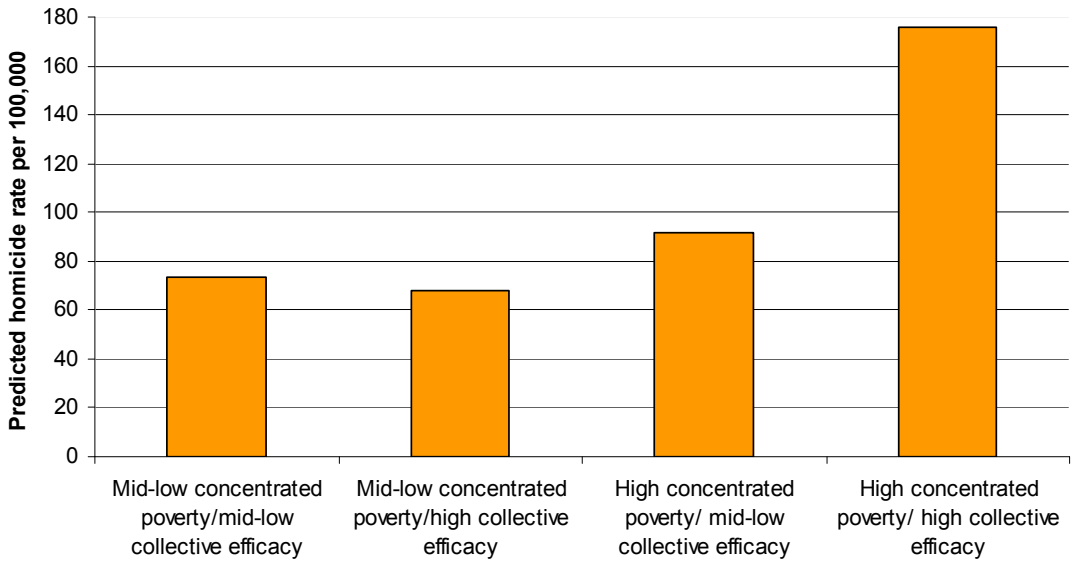


Table 6. Multilevel graded response model of individual and neighborhood-level predictors of perceived violence in Chicago, 2002*

	Model 1 Coeff (SE)	Model 2 Coeff (SE)
Respondent- level perceived violence factor by:		
Years in residence	**0.01 (0.004)**	**0.007 (0.003)**
House owned	**-0.18 (0.13)**	**-0.21 (0.09)**
Male	0.05 (0.07)	0.02 (0.07)
Age (reference: 18-29)		
30-39	-0.05 (0.11)	-0.009 (0.09)
40-49	-0.16 (0.14)	-0.15 (0.12)
50-59	-0.22 (0.19)	-0.15 (0.14)
60-69	**-0.74 (0.21)**	**-0.53 (0.18)**
70+	**-1.13 (0.25)**	**-0.98 (0.19)**
Income (reference: 10-<30,000)		
<$10,000	**0.51 (0.15)**	**0.45 (0.13)**
30-<50,000	**0.21 (0.1)**	**0.19 (0.09)**
50+	0.01 (0.13)	0 (0.11)
Missing	-0.17 (0.14)	-0.16 (0.13)
Education (reference: 12-15 years)		
<12 years	**-0.28 (0.13)**	**-0.32 (0.1)**
16+ years	0.12 (0.12)	0.16 (0.09)
Marital status (reference: never married)		
Married	**-0.28 (0.11)**	**-0.34 (0.1)**
Separated	-0.0 (0.11)8	-0.12 (0.1)
Widowed	-0.11 (0.18)	-0.26 (0.16)
Neighborhood level perceived violence factor by:		
Concentrated poverty		
Poverty tertile 2	**0.59 (0.28)**	**0.48 (0.14)**
Poverty tertile 3	**1.27 (0.23)**	**0.88 (0.22)**
Stability		
Stability tertile 2	-0.18 (0.17)	-0.05 (0.11)
Stability tertile 3	-0.28 (0.2)	**-0.35 (0.13)**
Log of population density (per 100,000)	-0.02 (0.13)	-0.008 (0.09)
Homicide rate per 100,000		
Homicide tertile 2		0.22 (0.36)
Homicide tertile 3		0.58 (0.37)
Collective efficacy		
Collective efficacy tertile 2	**-0.74 (0.21)**	**-0.43 (0.13)**
Collective efficacy tertile 3	**-0.89 (0.22)**	**-0.65 (0.15)**
Variance		
Variance within neighborhood	**2.51 (0.23)**	**2.6 (0.24)**
Variance between neighborhoods	**0.32 (0.15)**	**0.34 (0.05)**
Model fit		
Log likelihood (# parameters)	-13567.8 (49)	-13502.2 (51)
AIC	27234	27106.5

* All significant associations at the p<0.05 level are highlighted in bold

Table 7. Multilevel graded response model of individual and neighborhood-level predictors of perceived violence in Medellin, 2003-04 *

	Model 1 Coeff (SE)	Model 2 Coeff (SE)
Respondent- level perceived violence factor by:		
Years in residence	0.005 (0.004)	0.004 (0.004)
House owned	0.05 (0.08)	0.05 (0.07)
Male	0.16 (0.1)	**0.18 (0.09)**
Age (reference: 18-29)		
12-17	-0.005 (0.11)	-0.01 (0.11)
30-39	-0.07 (0.16)	-0.07 (0.14)
40-49	-0.19 (0.12)	-0.19 (0.13)
50-59	-0.36 (0.19)	-0.34 (0.21)
60-66		
Income (reference: 1-2 minimum salaries)		
<1 minimum salary	0.16 (0.1)	0.23 (0.13)
2-3 minimum salaries	-0.13 (0.13)	-0.12 (0.14)
3-7 minimum salaries	-0.33 (0.19)	-0.28 (0.19)
7+ minimum salaries	-0.42 (0.41)	-0.43 (0.32)
Social class		
Social class	0.07 (0.12)	-0.009 (0.15)
Marital status (reference: never married)		
Married	-0.21 (0.12)	-0.19 (0.11)
Separated	-0.21 (0.23)	-0.19 (0.16)
Widowed	0.03 (0.29)	-0.07 (0.26)
Cohabiting	-0.01 (0.15)	-0.09 (0.14)
Neighborhood level perceived violence factor by:		
Concentrated poverty		
Poverty tertile 2	**0.75 (0.23)**	**0.55 (0.25)**
Poverty tertile 3	**1.18 (0.33)**	**0.94 (0.43)**
Stability		
Stability tertile 2	-0.12 (0.39)	-0.04 (0.13)
Stability tertile 3	**-0.14 (0.37)**	0.03 (0.11)
Log of population density (per 100,000)	0.05 (0.15)	0.09 (0.07)
Homicide rate per 100,000		
Homicide tertile 2		0.18 (0.14)
Homicide tertile 3		**0.34 (0.09)**
Collective efficacy		
Collective efficacy tertile 2	**0.02 (0.14)**	0.1 (0.17)
Collective efficacy tertile 3	**0.42 (0.31)**	**0.33 (0.17)**
Variance		
Variance within neighborhoods	**1.73 (0.25)**	**1.7 (0.28)**
Variance between neighborhoods	**0.24 (0.11)**	0.13 (0.09)
Model fit		
Log likelihood (# parameters)	-9937.7 (48)	-9925.8 (50)
AIC	19971.4	19951.7

* All significant associations at the $p<0.05$ level are highlighted in bold

Table 8. Estimated linear association between neighborhood typologies of collective efficacy, residential stability and concentrated poverty, and the latent neighborhood-level perceived violence factor

	Chicago		Medellin	
	Model 1*		Model 1*	
	Coeff	SE	Coeff	SE
Neighborhood- level perceived violence factor by:				
Collective efficacy/concentrated poverty (reference: mid-low concentrated poverty/ mid-low collective efficacy)				
Mid-low concentrated poverty/ High collective efficacy	**-0.55**	**0.13**	**0.66**	**0.19**
High concentrated poverty/ Mid-low collective efficacy	**0.48**	**0.16**	**0.49**	**0.14**
High concentrated poverty/ High collective efficacy	**0.55**	**0.22**	**0.92**	**0.24**
Variance				
Within-neighborhood	**2.7**	**0.25**	**1.7**	**0.26**
Between-neighborhood	**0.38**	**0.07**	**0.15**	**0.07**
Model fit				
Log likelihood (# of parameters)	-13159.4 (50)		-9707.3 (49)	
AIC	26418.9		19512.6	

*Model includes adjustment for: length of residence in neighborhood, sex, age, income, social class (Medellin) or education (Chicago), marital status, home ownership, neighborhood homicide rate, residential stability in neighborhood, and the log of neighborhood density per 100,000

Figure 7. Predicted perceived violence factor scores by neighborhood collective efficacy and concentrated poverty, Chicago 2002

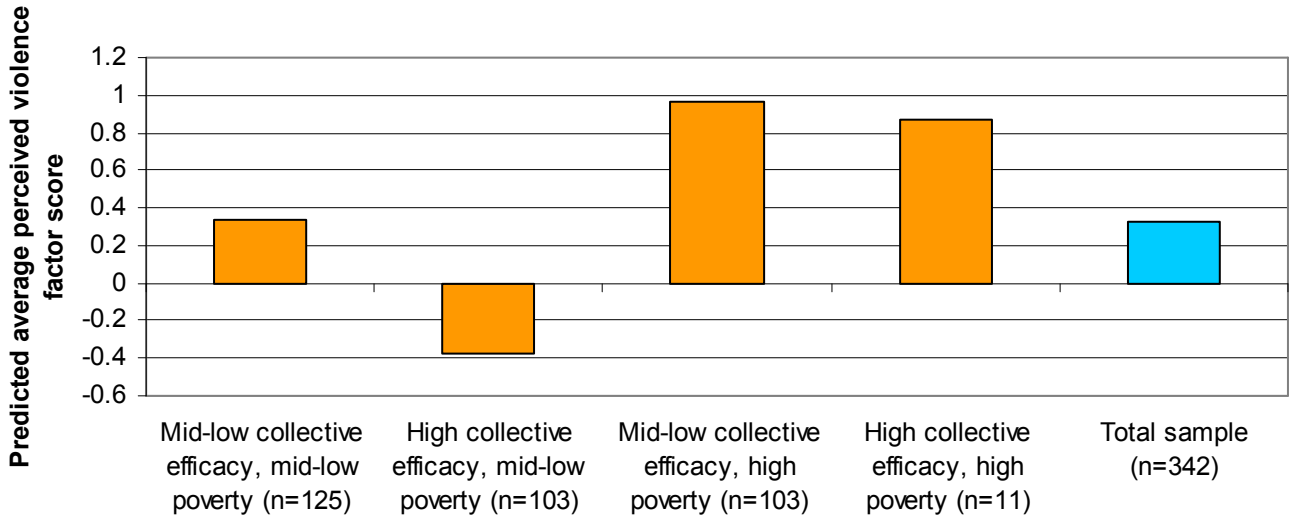
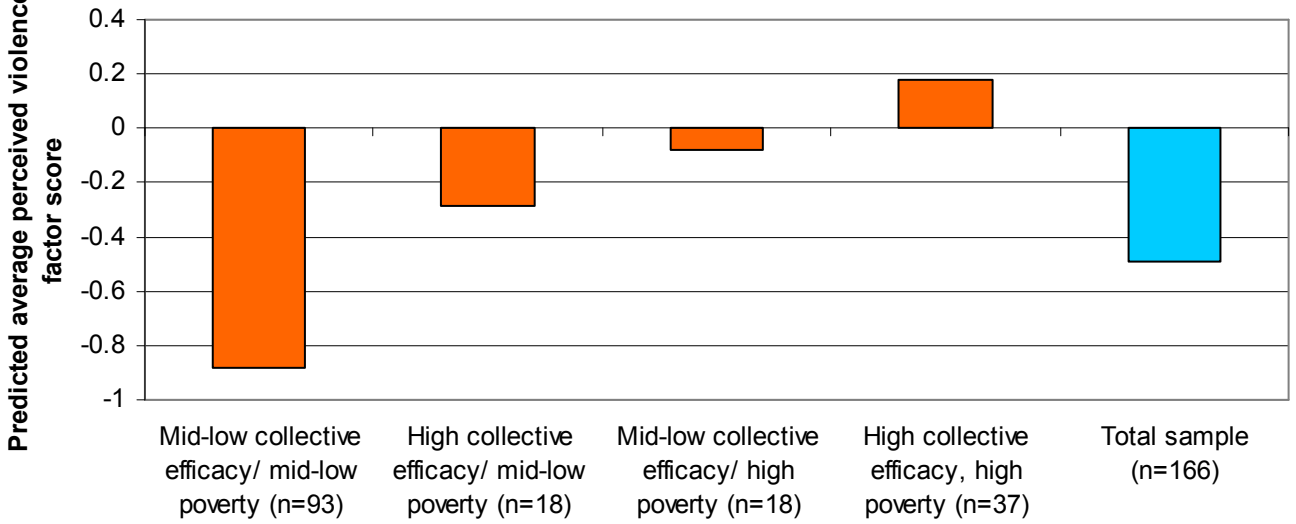


Figure 8. Predicted perceived violence factor scores by neighborhood collective efficacy and concentrated poverty, Medellin 2003



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Appendix I: Study measures

Table 1. Items in the collective efficacy scale subdomains: social cohesion and informal social control

Chicago		Medellin	
Social cohesion			
Item	Response Options	Item: How likely is it that in your neighborhood:	Response options
When a neighbor is not at home or on vacation, how often do you and other neighbors watch over their property?	Often-Never	Neighbors help survey the neighborhood	Very likely--unlikely
People around here are willing to help their neighbors	Strongly agree-strongly disagree	One neighbor helps the other	
This is close-knit neighborhood		People offer to work in a committee or council for the neighborhood	
You can count on adults in this neighborhood to watch out that children are safe and don't get into trouble		Neighbors help survey or care for the children of others	
Informal social control			
If there was a fight in front of your house and someone was being beaten or threatened, how likely is it that your neighbors would break it up?	Very likely--very unlikely	Someone would call the police if they saw a fight in the street	Very likely--unlikely
If a group of neighborhood children were skipping school and hanging out on a street corner, how likely is it that your neighbors would do something about it?		A neighbor would advise the parents of a child that their child was making trouble	

If some children were spray-painting graffiti on a local building, how likely is it that your neighbors would do something about it?	A neighbor would reprimand someone that left graffitti in a house or building in the neighborhood
If a child was showing disrespect to an adult, how likely is it that people in your neighborhood would scold that child?	Someone would intervene if a child was being disrespectful to an adult

Table 2. Measures of neighborhood violence

Chicago		Medellin	
Homicide rate in 2003 per 100,000 population			
Standardized to 2000 population Source: Chicago Police Department		Standardized to 2002 population Source: Office of the Public Prosecutor	
Items in the neighborhood perceived violence scale: How often do the following events occur in your neighborhood?			
Item	Response Options	Item:	Response options
Fight with weapon in the neighborhood	Never-often	Fight with weapon in the neighborhood	Never-often
Violent argument in the neighborhood		Fight between neighbors	
Gang fights		Gang fights	
Sexual assault		Sexual assault	
Robbery/mugging		Robbery/mugging	

Table 3. Measures of structural neighborhood characteristics and individual resident characteristics

Chicago	Medellin
Concentrated poverty: factor score with high loadings on:	
Proportion of residents living below the poverty line	Proportion of residents in strata 1 and 2 of social class
Proportion of residents in public assistance	Proportion of residents in public assistance
	Mean social class in neighborhood
Residential stability: factor score with high loadings on:	
Proportion of residents five years old and older who lived in same house for five years or more	Proportion of residents five years old and older who lived in same house for five years or more
Proportion of owner-occupied homes in the neighborhood	Proportion of owner-occupied homes in the neighborhood
Population density	
Log of the population density per 100,000 people in 2000	Log of the population density per 100,000 people in 2002
Previous neighborhood violence	
Homicide rate per 100,000 people in 2001-02	Homicide rate per 100,000 people in 2001-02
Resident-level covariates	
Age: 18-29; 30-39; 40-49; 50-59; 60-69; 70+	Age: 12-17; 18-29; 30-39; 40-49; 50-59; 60+
Sex	Sex
Income: <$10,000; 10-<30,000; 30-<50,000; 50+	Income: <1 minimum salary; 2-3; 3-7; 7+ minimum salaries
Education: <12 years; 12-15 years; 16+	Social class: 1-6

Marital status: Married; separated; single; widowed	Marital status: Married; separated; single; widowed; cohabiting
Home ownership (yes/ no)	Home ownership (yes/no)
Number of years in residence in the neighborhood	Number of years in residence in the neighborhood

Appendix 2. Multilevel factor analysis model specification

In the multilevel factor model used in this paper, Y_{hij} is the h-th observed ordinal variable (item) (h=1,2,…8) for the i-th subject (i=1,2,…I) of the j-th cluster (j=1,2,…J). A two-level factor model for ordinal variables has two components: 1) a threshold model which relates a set of continuous latent variables, $\tilde{Y}_{hij}$, to the observed ordinal counterparts Y_{hij}; and 2) a two-level factor model for the set of continuous latent variables. For the threshold model, we assume that each of the observed responses Y_{hij}, which takes values in 1,…, C_h, is generated by a latent continuous variable $\tilde{Y}_{hij}$, through the following relationship:

$$\left\{Y_{hij} = c_h\right\} \Leftrightarrow \left\{\gamma_{ch-1,h} < \tilde{Y}_{hij} \leq \gamma_{ch,h}\right\}$$

The factor model is then defined on the set of latent variables:

$$\tilde{Y}_{hij} = \mu_h + \left[\sum_{b=1}^{B} \beta_{bh}^{(2)} \theta_{bj}^{(2)} + e_{hj}^{(2)}\right] + \left[\sum_{w=1}^{W} \beta_{wh}^{(1)} \theta_{wij}^{(1)} + e_{hij}^{(1)}\right] + \gamma x_{ij} + \alpha wj$$

$$\theta_{hij}^{1} \perp \theta_{hj}^{2}$$

$$\theta_{wij}^{(1)} \sim MVN(0, \Omega_1), \theta_{bj}^{(2)} \sim MVN(0, \Omega_2)$$

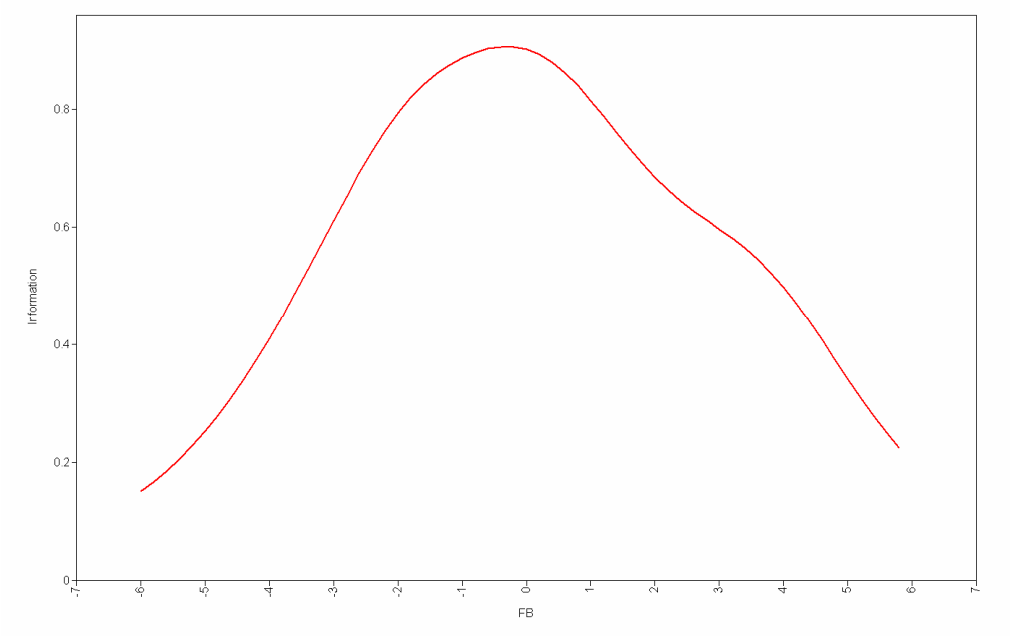
$$e_{hij}^{(1)} \sim N(0, \Sigma^{(1)}), e_{hj}^{2} \sim N(0, \Sigma^{(2)})$$

In this model the neighborhood level has B factors with corresponding loadings $\beta_{bh}^{(2)}$ and item-specific errors $e_{hj}^{(2)}$, while the respondent level has W factors with corresponding loadings $\beta_{wh}^{(1)}$ and item-specific errors $e_{hij}^{(2)}$, and μ_h are the item means. γ refer to the coefficients estimating association between respondent-level characteristics (X_{ij}) and the respondent-level factor, and α, the coefficients estimating association

between neighborhood-level characteristics (W_i) and the neighborhood-level factor. The associations between respondent and neighborhood-level covariates and the factors are interpreted as linear functions (Grilli & Rampichini 2004).

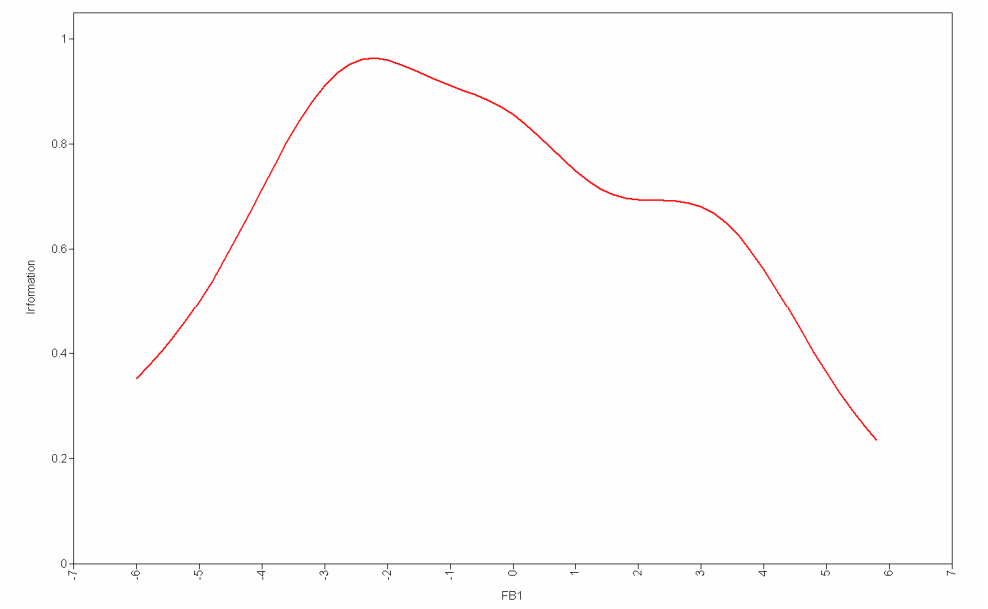
Appendix 3

Figure 1a. Total information curve, or level of scale reliability, at different levels of the underlying neighborhood collective efficacy factor, Medellín, 2002-03



Latent neighborhood collective efficacy (θ)

Figure 1b. Total information curve, or level of scale reliability, at different levels of the underlying neighborhood collective efficacy factor, Chicago, 1995



Latent neighborhood collective efficacy (θ)