Social disorganization and homicide mortality rate trajectories in Brazil between 1991 and 2010

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ABSTRACT

Since the 1990s, researchers have noted declining trends in crime and violence, particularly homicide, in Western countries. Studies have explored national and sub-national trends using latent trajectory analysis techniques and identified several factors associated with declining and/or increasing trajectories. Social disorganization (SD) has been consistently linked to increases in homicide rates over time, explaining at least some of the spatial and temporal heterogeneity of homicide. Similar studies have not yet been carried out in Latin America's cities. In this paper we use Group Based Trajectory models to study homicide mortality rate [HMR] trajectories in Brazilian municipalities between 1991 and 2010. Then, through binary and multinomial logistic regression we investigated the association between SD in 1991, and the likelihood of an increasing HMR trajectory. We carried out an ecological time series study using all Brazilian municipalities in the period between 1991 and 2010 (n = 4491). Data on homicide deaths were collected from the Mortality Information System of the Ministry of Health and standardized by age to calculate HMR per 100,000 population. Socioeconomic and demographic data for 1991 were used to compose the composite measure of SD. Our results highlight the spatial and temporal heterogeneity of homicide mortality in Brazilian municipalities. While national trends are steadily increasing, disaggregating municipal trajectories shows that this is driven by a small proportion of municipalities in the country. We found that SD is associated with an ascending homicide trajectory. This result generally supports the notion that poor social structural conditions can create 'space' for criminal behavior and groups and, consequently, violent death.

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1. Introduction

The 1990s represented a major shift in crime and homicide trends in western countries (Tseloni et al., 2010; Weiss et al., 2016). In the US, many cities showed significant reductions in the levels of violence and homicide, with the most famous being New York City's dramatic 73% decline in homicide between 1990 and 2000 (Messner et al., 2005; Baumer and Wolf, 2014). It seems, however, that this movement is not homogeneous, as researchers have found differential patterns between cities and population groups. The examination of shared trajectories of interpersonal violence and homicide reduction is now a topic of special attention. The task is

no longer to understand and explain why homicide rates vary between different areas or clusters in space but also to recognize the existence of heterogeneity between and within the same areas over time, and to understand the factors associated with differential trends (McCall et al., 2011; Cerda and Concha-Eastman, 2011; Griffiths and Chavez, 2004; Kubrin and Herting, 2003; McDowall and Loftin, 2009; Stults, 2010; Parker et al., 2016).

Researchers have modelled homicide trajectories within and between communities using analytical techniques and criminological theories derived from developmental psychology. The idea is that communities as well as individuals go through different developmental stages and can adopt distinct 'careers' in crime and violence (Bursik and Grasmick, 1992; Fagan and Davies, 2004; Schuerman and Kobrin, 1986). Studies using latent trajectory techniques have made it possible to identify the existence of heterogeneity in the evolution of homicide rates in intra-urban space (Griffiths and Chavez, 2004; Stults, 2010). Stults (2010) found significant variation in homicide trajectories across Chicago

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neighborhoods, and investigated the extent to which the differences can be explained by initial socioeconomic conditions. He concluded that social disadvantage is associated with a greater chance of an upward or persistently high homicide rate trajectory.

Very few studies, however, studied homicide trajectories on the city level (McDowall and Loftin, 2009; McCall et al., 2011; Parker et al., 2016). McCall et al. (2011) identified four distinct trajectory groups among 157 large US cities and found that social disadvantage and social disorganization are associated with a higher homicide trajectory group. Heterogeneous homicide trajectories were also found among blacks and whites in US cities (Parker et al., 2016). These studies highlight the importance of local level analysis (Parker et al., 2016). As far as we know, however, no study has been conducted in cities outside the US using this methodology.

Latin America, and Brazil specifically, does not seem to share in the declining trajectories described in the US and other western countries. Since the 1990's Brazil has been recognized as one of the most violent countries in the world, with the total number of homicide death exceeding 50,000 each year since 2008. According to the World Health Organization (Krug et al., 2002), by the end of the 1990s, Brazil had the third highest Homicide Mortality rates (HMR) in the Americas (23 per 100,000 inhabitants). More recent descriptive studies of homicides in Brazil have highlighted changes in trends between regions, states, and capitals (Waiselfisz, 2008; Andrade and Diniz, 2013). Even so, studies that analyze homicide trends in Brazilian municipalities are rare. Furthermore, there is no research that explores and explains different trajectories of homicide in Brazilian municipalities from a social ecological perspective.

Social disorganization (SD) theory is a dominant theoretical perspective that aims to explain the spatial concentration of crime and violence within cities (Bursik, 1988; Kubrin and Weitzer, 2003) focusing on the role that ecological conditions play in hindering or weakening the capacity of a community to attain common goals and engage in effective social control (Bruinsma et al., 2013; Kubrin and Weitzer, 2003; Sampson and Groves, 1989). Social networks, ties, and capital are key features necessary for communities to supervise peer groups, facilitate cooperation, foster mutual trust, and ultimately control crime (Kawachi et al., 1999). Specifically, the theory proposes that social structural conditions such as poverty, ethnic heterogeneity, and family disruption, weaken the ability of communities to build and maintain social ties and collectively supervise and regulate social norms, consequently increasing community vulnerability to crime and victimization (Sampson et al., 1997; Kawachi et al., 1999).

In many Latin American cities including in Brazil, high levels of violence are strongly linked to organized crime and gang activity (Ceccato et al., 2007; UNODC, 2014; Zaluar, 2010; Peres et al., 2016). SD creates favorable conditions for the emergence and consolidation of organized crime groups and gangs (Oliveira et al., 2015) once residents in disorganized areas lack the collective capacity to confront criminal groups (Rengert et al., 2005). In addition, socially disorganized communities in Brazil are often ignored by state institutions and subject to arbitrary or repressive security policies and policing tactics (Cardia et al., 2003). Police violence, in turn, can undermine the legitimacy of state actions among the population (Kane, 2005; Nivette, 2016). When these mechanisms of social control are weakened, residents in disadvantaged neighborhoods must rely on illegal and violent forms of conflict resolution, which would explain to some extent the unequal growth of crime and violence (Kubrin and Weitzer, 2003; Messner et al., 2004; Nivette, 2014).

In summary, two theoretical pathways may link SD and high HMR. The first suggests that structural characteristics of disorganization can compromise community social controls and increase vulnerability to crime and violence. The second is based on the finding that poor access to state security services and exposure to police misconduct are often disproportionately concentrated in poor, socially disorganized communities. The resulting security gaps can motivate individuals and groups to seek justice and solve problems using extralegal, sometimes violent methods. In both cases, i.e. weakened social capacity and the absence of legitimate state security, SD can create 'space' for organized criminal groups, and their associated lethal violence, to emerge and flourish, increasing crime, violence and homicide rates.

According to Kawachi et al. (1999), the level of crime can be considered an indicator of the health of societies. The same can be said about violence and, ultimately, about homicide. Scholars argue that violent crime could be an important concept to understand health inequalities. The idea is that the level of violent crime is an indicator of collective wellbeing, as it is associated with high social disorganization, low social capital, and high relative deprivation. Tagaki et al. (2012) state that crime victimization is, by itself, an important public health issue, given that contextual determinants of crime and violence and health overlap. As such, the study of contextual factors associated with crime and violence can contribute greatly to our understanding of health disparities (Tagaki et al., 2012).

This paper makes two contributions to the understanding of HMR in developing countries. First, we explore municipal criminal 'careers' by investigating the heterogeneity of HMR trajectories in Brazilian municipalities over a 20-year period. In doing so, we use group based trajectory modeling techniques to identify groups reflecting distinct temporal patterns of urban lethal violence between 1991 and 2010. Second, we use the resulting groups to investigate the association between SD and increasing HMR trajectories. We expect that SD increases vulnerability to criminal and violent activity, therefore increasing the likelihood of escalating homicide mortality rate trajectories.

2. Materials and methods

2.1. Data

The dependent variable is the age-standardized HMR per 100,000 population for all municipalities in Brazil between the years 1991 and 2010 (n = 4491). Brazil is legally divided in Regions, States and Municipalities. A Municipality can comprise urban areas (cities), rural areas and, in some cases, different smaller cities. Official data are available for Municipalities, the smaller political and administrative area in Brazil. The municipalities created after year 1991 were excluded (n = 1074) to avoid issues related to missing data and an interrupted time-series. Data on deaths due to homicide and external causes (EC) with undetermined intent (UI) were obtained from the Brazilian Mortality Information System of the Ministry of Health (SIM-MS) for each city and year, resulting in a total of 89,820 data points. In Brazil, it is mandatory that all deaths due to EC be subjected to a necroscopic examination by a coroner in order to define the cause of death (i.e. accident, suicide, or homicide/aggression) according to the 10th Revision of the International Classification of Diseases (ICD-10).

Issues on the quality of homicide mortality data have been recognized in Brazil since the early 1990's, particularly in relation to the failure to establish the intentionality of the violent act that resulted in the death. In such cases death is classified as UI and is coded under the ICD-10 code Y10-Y34. As a result, the numbers of homicide are underestimated due to misclassification, which can bias time series analysis, as it has a direct effect on homicide trends (Cerqueira, 2012). In order to account for this potential bias, all cases coded following the ICD-10 classification as X85-Y09 (Aggression) or Y10-Y34 (UI) were included in our study. Data were collected by age groups (0—4; 5—9; 10—14; 15—19; 20—29; 30—39;