Examining Social-Ecological Correlates of Youth Gang Entry Among Serious Juvenile Offenders: A Survival Analysis

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Decades of research have categorized risk and protective factors for youth gang involvement in social contexts that include individual, family, peer, school, and community factors. However, most studies are cross-sectional and only examine 1 or 2 social-ecological contexts. This study, which used a time-to-event model with time-variant and time-invariant predictors, adds to this literature by using longitudinal social-ecological factors to examine increases in the hazard of gang entry among serious juvenile offenders followed for 7 years during the transition from adolescence to young adulthood. Lower socioeconomic status (SES), higher rates of exposure to violence, self-reported offending, and time spent in jail were associated with higher hazards rates of gang entry. Temperance (suppression of aggression and impulse control) was associated with decreases in the hazard of gang entry. Among family characteristics, higher parental hostility and having a father who had been arrested were associated with increases in the hazard of gang entry. Resistance to peer influence was a protective factor for gang entry. In addition, individuals who reported associating with delinquent peers or who had a higher proportion of friends who had been arrested had significant increases in the hazard for gang entry. School orientation was a significant protective factor, and neighborhood disorganization was associated with increases in the hazard for gang entry. Strategies for early intervention and prevention efforts are discussed.

Public Policy Relevance Statement
Gangs are complex systems that often threaten the safety and well-being of youth and their communities. Considering most known risk and protective factors of gang involvement, this study underscores the protective power of parental monitoring and school orientation in mitigating the risk of adolescent gang entry. These findings suggest that policies should foster increased parental monitoring and school orientation in all communities but especially communities with low socio-economic status, Latinx, and African-American residents.

In recent years, gangs in the United States have grown in membership and activity, signaling a major public health and safety concern (Carson & Esbensen, 2017; Pyrooz & Sweeten, 2015; Watkins & Taylor, 2016). There is no one agreed-upon definition of what a gang is or is not. The National Gang Center (n.d.) offers some common defining criteria indicating that gangs are organized social groups that typically include three or more individuals ages 12–24. Members tend to take on a shared identity based on membership that is often represented by a name, symbols, or traditions. These groups also regularly engage in elevated levels of criminal or violent activity, particularly against nonmembers or specific targets. In 2012, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) reported that there were approximately 30,700 gangs (an increase from 29,900 in 2011) with 850,000 members (an increase from 782,500 in 2011), of which nearly 300,000 were youth members (Eagley, Howell, & Harris, 2014). However, more current research suggests these

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figures may be underestimated (Pyrooz & Sweeten, 2015). A recent study that used national estimates of youth gang membership reported that there were approximately 1 million youth gang members in the United States, which is more than 3 times that of previous estimates (Pyrooz & Sweeten, 2015). Some research has also shown that in some areas, 7–9% of adolescents report currently being a member of a youth gang (Estrada, Gilreath, Astor, & Benbenishty, 2016). These figures represent the alarming rates at which youth are involved in organized social groups primarily defined by the violence and criminality in which they engage. Moreover, gang-related crime and violence can be harmful to the individuals involved and local communities alike. Several studies suggest that the roots of gang violence are relatively common across cities and include conflicts over geographic areas considered to be turf, the violence of gang norms, threatened honor, and retaliation (Decker, 1996; Hughes & Short, 2005). According to one study, between 2011 and 2012, gang-related homicides increased by 20% in large urban cities (Eagley et al., 2014).

Ecological Systems Theory

The ecological systems theory (Bronfenbrenner, 1977, 1999, 2005; Bronfenbrenner & Ceci, 1994) can be used to contextualize extant research that has documented risk and protective factors associated with youth gang involvement. This framework places the individual at the center of several nested social contexts (i.e., family, peer group, school environment, and the broader community) that individually and collectively shape the development of the individual (Bronfenbrenner, 1977). Researchers have found evidence of constructs at every ecological level associated with increased and decreased likelihood of gang involvement (Craig, Vitaro, Gagnon, & Tremblay, 2002; Hill, Howell, Hawkins, & Battin-Pearson, 1999). However, García Coll and colleagues (1996) offered important amendments to this model indicating that for marginalized and minoritized populations, particularly children of color in the United States, dominant models of development are not sufficiently complex to capture their experiences, such as oppression and discrimination, internalized stigma, "code-switching" (i.e., alternating between at least two languages or dialects), adaptive culture, and non-White family traditions and norms. Thus, the current study employed this model to explore how a youth's identity interacts with many nested systems to yield temporally sensitive risk and protective indicators of joining a gang.

Individual and Family Level

At the individual level, factors include race, socioeconomic status, juvenile justice system involvement, and mental and behavioral health problems (e.g., depression, aggression, substance use). At the family level, factors include family violence, lack of parental monitoring and supervision, and incarcerated family members. Both individual- and family-level factors have been found to be strong indicators of increased risk of gang involvement (Hill et al., 1999; Hill, Lui, & Hawkins, 2001; Merrin, Hong, & Espelage, 2015). Adolescents spend a significant amount of time with their families during this time of development; as such, family risk and protective factors can have a strong influence on the development

of youth, particularly around deciding whether or not to join a youth gang.

School and Peer Level

Regarding school and peer relations, there is little and inconsistent research on associations among school violence and gang membership. Extant research findings indicate that there may be an indirect association. One large-scale ($N = 272,863$) study in California found no direct relation between school violence and gang membership (Estrada, Gilreath, Astor, & Benbenishty, 2014). However, it identified a mediating pathway of school risk behaviors (e.g., truancy, school substance use, peer approval of risk behaviors, social connectedness to school) between gang membership and aggression perpetration and victimization at school (Estrada et al., 2014). Further, Bandyopadhyay, Cornell, and Konold (2009) found a correlation between overall rates of bullying in a school and teachers' understanding of gang presence. This general assessment aligns with a qualitative study conducted by Forber-Pratt and Espelage (2018), which found that sexual harassment, a form of aggression, appeared to occur more frequently when there was a visible gang presence in a midwestern U.S. middle school. However, Bradshaw, Waasdorp, Goldweber, and Johnson (2013) found that bully victims (i.e., students who both perpetrated and were victimized) were about 12 times as likely to have been a gang member as youth who were not heavily involved in bullying. Thus, further work is needed to elucidate these school-based peer dynamics.

Community Level

At the neighborhood and community level, witnessing violence in one's community and living in a resource-poor environment are both indicators associated with an increased likelihood of youth being in a gang (Hill et al., 1999, 2001; Merrin et al., 2015). Papachristos, Hureau, and Braga (2013) explored the geographic and social network mechanisms that facilitate gang violence. They found that geographic proximity of turf was highly associated with intergang violence. Thus, students who live in neighborhoods where more than one gang is present are more likely to witness violence. Further, students involved in gangs vary in their level of participation in gang activities and how central membership is to their identity (Pyrooz & Sweeten, 2015). Further, Decker and Curry (2000) explored why youth join gangs through extensive interviews with 96 middle school students. They found that a majority of their sample reported that a significant reason they joined a gang was because gang members were present in their neighborhood, which, in the United States, also determines which high school a student attends and thus the available peer network with which to socialize. A minority of the sample suggested membership was attributed to family members belonging or having nothing else to do. Interestingly, this study identified differences in the level of participation in gangs; some students were highly central members, whereas others were more peripheral members and more likely to cease gang involvement eventually. For the former, impressing female peers and feeling important among friends were highly prevalent reasons for joining, whereas for the latter, this was not true. Instead, for the peripheral group, these students' primary reason for joining was to feel important in the neighborhood.

It should be noted that these different social-ecological contexts inevitably interact with higher societal systems. Foremost, White supremacist practices, policies, and laws have created racially segregated neighborhoods and extreme wealth-distribution inequities in which Black and Latinx individuals have been denied access to wealth (Oliver & Shapiro, 2006). Further, these communities face very close and unjust scrutiny by law enforcement, thereby increasing the rates at which youth and their family members become incarcerated (Angus & Crichlow, 2018). Although over-simplified here, this history has shaped the current state of affairs such that financial wealth, race, neighborhood safety, and justice involvement are often intertwined, demonstrating the interconnectedness of individual characteristics, neighborhoods, and macrosystems in the United States. Thus, risks in these different domains are tied to each other and the greater systems at play and cannot be meaningfully modeled in siloes.

Youth Gang Entry

Despite some empirical work on the general correlates of gang membership and qualitative depth in reasons for entry, this literature is limited in two primary ways. First, most studies lack temporal sensitivity; what is happening in a youth's life at a specific point when they enter a gang? Most studies use time-invariant measures of gang membership that do not assess the context around the point of gang entry, instead comparing average differences between youth gang members and nongang members at one point in time, with some studies also assessing youth who have resisted gang membership (De La Rue & Espelage, 2014; Merrin et al., 2015). Second, although the broader literature suggests that there are many sources of influence on a youth's decision to join a gang, most studies examine only a few predictors and do not assess risk and protective factors across a variety of ecological contexts. This piecemeal method fails to provide a full understanding of the relative strength of each risk and protective factor or how they interact. Taken together, there is a substantial gap in the empirical knowledge of when gang membership tends to begins and the comparative value of risk and protective factors across the social ecology surrounding the "tipping point" of joining a gang.

By examining actual gang entry longitudinally using a social-ecological model that compares behavior at an individual level, researchers can create a much more robust framework to identify the risk and protective factors involved as youth navigate their emerging self in their environment. The current study adds to this literature by using longitudinal social-ecological factors (i.e., individual, family, peer, school, neighborhood) to predict increases in the hazard of joining a gang among serious juvenile offenders followed for 7 years during the transition from adolescence to emerging adulthood.

Current Study

The current study addressed the following research questions: (a) To what extent are sex, race, or socioeconomic status associated with youth gang entry? (b) Within individual, family, peer, school, and neighborhood contexts, what are the risk and protective factors that are associated with youth gang entry? (c) What are the most predictive risk and protective factors across all social-ecological contexts?

Method

Participants

Data were obtained from the Pathways to Desistance Study, a longitudinal study of serious juvenile offenders ($N = 1,354$). To be considered for enrollment in this study, participants had to be adjudicated delinquents or found guilty of a serious offense. Data were collected over 7 years, with biannual assessments during the first 3 years and annual assessments (as a result of funding constraints) during the last 4 years of the study. The study had 89.5% retention. Additional details on the study design and methods can be found in Mulvey et al. (2004) and Schubert et al. (2004). At baseline, participants were, on average, 16 years old (standard deviation [SD] = 1.14). Most participants were male (86%), with 41% identifying as African American, 34% as Latinx, 20% as White, and 5% as another race/ethnicity. Participants reported being, on average, 13 years old ($SD = 2.0$) and 10 years old ($SD = 1.8$) for the age of drug and alcohol use and the age of the first offense, respectively. At baseline, 72% reported being currently enrolled in school, 77% reported fighting in school, and 23% reported bullying someone in school. Finally, 7% of participants had a diagnosis of major depressive disorder or posttraumatic stress disorder (PTSD) at baseline. See Table 1 for more demographic information.

Measures

Using a time-to-event model (survival model), the event was defined as the first time entering a youth gang. That is, the dependent variable measured the first instance of gang entry. Gang entry was assessed using an item that asked participants if they had entered a gang during the recall period (0 = no, 1 = yes). The gang variable measured joining a gang at each wave across the 7 years of the study period.

Individual dimension. Demographic data included gender (male reference group), racial minority status (Black/African American reference group), and age of first substance use (before 11 years old reference group), which were all dichotomous indicators. Socioeconomic status (Hollingshead, 1957) was measured using the Parental Index of Social Position (scores 11–17 = upper, 18–31 = upper middle, 32–47 = middle, 48–63 = lower middle, and 64–67 = lower), with lower scores indicating a higher social position. PTSD and major depressive disorder were assessed using a dichotomous indicator for the presence of PTSD in the past year with the Composite International Diagnostic Interview (Wittchen, Robins, Semler, & Cottler, 1993; World Health Organization, 1990). Psychopathy was assessed using Psychopathy Checklist: Youth Version (PCL-YV; Forth, Kosson, & Hare, 2003; time invariant; αs ranged from .70 to .95). Participants were taken through a semistructured interview to assess the youth's interpersonal behavior and obtain information on aspects of the youth's history and current functioning. The total score was used. Higher scores indicate endorsement of more psychopathic characteristics among youth.

Table 1. *Baseline Characteristics*

Characteristics	Total sample ($N = 1{,}354$), M (SD) or n (%)
Demographics	
Age, in years	16.04 (1.14)
Male, n (%)	1,170 (86.4)
White, n (%)	274 (20.2)
Black, n (%)	561 (41.4)
Latinx, n (%)	454 (33.5)
Other, n (%)	65 (4.80)
Neighborhood	
Neighborhood disorganization	2.35 (.752)
Family	
Socioeconomic status[a]	64.30 (.946)
Father drug problem, n (%)	487 (45.9)
Mother drug problem, n (%)	364 (28.16)
School	
Enrolled in school, n (%)	972 (71.9)
Fighting in school, n (%)	1,036 (76.5)
Bullied someone in school, n (%)	308 (22.7)
School orientation	3.56 (.250)
Psychiatric disorders	
Major depressive disorder,[b] n (%)	98 (7.37)
Posttraumatic stress disorder,[b] n (%)	87 (6.55)
Substance use and intraindividual	
Unemployment, n (%)	1,000 (73.9)
Age of substance use onset	13.0 (2.01)
Age of first offense	10.4 (1.81)
Exposure to violence	5.34 (2.99)
Temperance	2.87 (.854)
Emotional regulation	2.76 (.658)
Social and peer	
Peer delinquency[c]	2.03 (.826)
Friend arrests[d]	.617 (.426)
Resistance to peer influence[e]	2.98 (.575)

Note. Ranges: neighborhood disorganization, 1.0–4.0; school orientation, 1.0–5.0; depression, posttraumatic stress disorder, 0.0–1.0; exposure to violence, 0.0–13.0; temperance, 1.0–5.0; emotional regulation, 1.0–4.0; peer delinquency, 1.0–5.0; friend arrests, 0.0–1.0; resistance to peer influence, 1.3–4.0.
[a] Socioeconomic status was derived from the Hollingshead (1971) formula using parental education and parental occupation. Higher scores indicate lower socioeconomic status. [b] Diagnoses were derived from the Composite International Diagnostic Interview. [c] Delinquency scores were derived from the Peer Delinquent Behavior measure. [d] Friend arrests is the proportion of the participant's five closest friends who have been arrested. [e] Resistance to peer influence was derived using a scale developed for the Pathways to Desistance Study.

The Exposure to Violence Inventory (Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998; time varying; αs ranged from .67 to .78) was used to assess the frequency of exposure to violence, with higher scores indicating greater exposure to violence. Moral disengagement (time varying; αs ranged from .90 to .92) was assessed with a 32-item scale from the Mechanisms of Moral Disengagement Scale (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). Participants responded on a 3-point Likert-type scale ranging from 1 (*Disagree*) to 3 (*Agree*) to items regarding the adolescent's attitudes concerning the treatment of others. Higher scores indicate greater moral disengagement. Temperament was measured using the Emotionality, Activity, Sociability, and Impul-

sivity Inventory (EASI; Buss & Plomin, 1975; time invariant, α = .67). Participants responded on a 5-point Likert-type scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Higher scores indicate greater emotionality. Emotional regulation (time varying; αs ranged from .81 to .88) was assessed using the Children's Emotion Regulation Scale (Walden, Lemerise, & Gentile, 1992). Participants responded on a 4-point Likert scale ranging from 1 (*Not at all like me*) to 4 (*Really like me*). Higher scores indicate a better ability to regulate emotions.

We also assessed several constructs related to criminal behavior. Age of first offense was a continuous (time-invariant) variable determined by asking youth at what age they committed their first crime from a list of over 20 offenses. The Self-Reported Offending scale (SRO; Huizinga, Esbensen, & Weihar, 1991; time varying) was used to assess adolescents' accounts of involvement in antisocial and illegal activities. The SRO consists of 24 items eliciting involvement in a variety of different crimes. The complete SRO construct was used, providing a proportion of the total number of acts committed. Gun accessibility (time varying) was assessed by asking participants how easy it would be for them to purchase a gun. Finally, we included time spent in jail or prison (time varying) as a construct to control for the amount of time spent outside of the community and to assess if time spent in a facility was associated with higher odds of entering a gang.

Family dimension. Dimensions related to parents and peers were also assessed. Parental substance use and parental arrests were dichotomous indicators assessing past or current substance use by the mother and father and whether one or both parents had been arrested in the past 6 months. Parental warmth and hostility (time varying; αs ranged from .78 to .96) were measured using the Quality of Parental Relationships Inventory (Conger, Ge, Elder, Lorenz, & Simons, 1994). Parental monitoring (time varying; αs ranged from .92 to .95) was assessed using the Parental Monitoring Inventory (Steinberg, Lamborn, Dornbusch, & Darling, 1992). Youth responded to a 9-item scale with response options on a 4-point Likert-type scale ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*) about parenting practices related to the supervision of the study participant.

Peer dimension. Peer deviance (time varying; αs ranged from .89 to .94) was measured using the mean values of both antisocial peer behaviors and antisocial peer influences from the Peer Delinquent Behavior measure (Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994). Participants responded on a 5-point Likert-type scale ranging from 1 (*None of them*) to 5 (*All of them*). Higher scores indicate associating with more delinquent peers. Friend arrests (time varying) was the proportion of the participants' five closest friends who had been arrested. Resistance to peer influence (time varying; αs ranged from .73 to .78) was measured using a scale developed by the original project investigators for the Pathways to Desistence Study. Participants were asked to rate how accurate statements about their friends were for them (i.e., "really true"). The items were averaged, with higher scores indicating less peer influence.

School dimension. Two dichotomous items assessed if the youth had engaged in fighting or bullying perpetration in school. School orientation (seven items; e.g., "Schoolwork is very

important to me") and teacher bonding (three items; e.g., "Most of my teachers treat me fairly") were assessed using school attachment items (Cernkovich & Giordano, 1992). The youth responded on a 5-point Likert-type scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly agree*), with higher scores indicating greater academic commitment.

Neighborhood dimension. Neighborhood disorganization (time varying; αs ranged from .94 to .96) was measured using the Neighborhood Conditions Measure (Sampson & Raudenbush, 1999), which assessed physical and social disorder. A total score was used to assess neighborhood disorder. Participants responded on a 4-point Likert-type scale ranging from 1 (*Never*) to 4 (*Often*), with higher ratings indicating more neighborhood disorder.

Analytic Plan

A Cox proportional hazards regression with time-varying and time-invariant covariates, a type of survival model (Singer & Willett, 2003), was the primary analytical approach. The follow-up period, defined in the number of months, was used as the survival time. The event was defined as the time when participants reported entering a gang. As such, individuals who reported being in a gang at baseline were *left-censored* and are not included in the current analysis. Censored time was treated as the amount of time to the end of the study period (e.g., did not experience the event) or loss to follow-up. In total, 125 individuals reported entering a gang during the recall period. Associations between our predictors and the outcome (e.g., time to gang entry) were quantified using hazard ratios and 95% confidence intervals. Proportional hazard assumptions were assessed using residual plots and K-M curves. To test our research questions, we ran six Cox proportional hazard models consisting of unadjusted and adjusted models. In our unadjusted analyses, each of the predictors from each of the dimensions (e.g., individual, family, peer, school, and neighborhood) were entered separately (Models 1–5) to answer our first two research questions that examined demographics and risk and protective factors within a social-ecological context. In our adjusted analyses, all predictors from all dimensions were entered into the model simultaneously (Model 6) to examine our third research question by assessing key risk and protective factors. Our models utilized time-variant and time-invariant predictors over the 7-year study period, allowing us to capture both static and shifting risk factors. Missing data were minimal (<10%) and were handled using multiple imputation (*k* = 50; Allison, 2002; Graham, Olchowski, & Gilreath, 2007). All analyses were conducted using SAS Version 9.4.

Results

Descriptive Statistics

Descriptive statistics for all study variables are presented in Table 1. The sample was primarily a low-income sample with an average socioeconomic status (SES) of 64.30 (higher scores indicate lower SES) and mainly made up of Black (41.4%) and Latinx (33.5%) participants, with a lower frequency of White (20.2%) and other race/ethnicity (4.8%) participants. Participants reported young ages for the onset of substance use (13 years) and the age of first offense (10.4 years). In addition, participants reported moderately high rates of neighborhood disorganization (2.35 on a 4-point scale) and peer delinquency (2.03 on a 5-point scale) but low average rates of friend arrests (.617 on a 5-point scale).

Social-Ecological Determinants by Dimension

Table 2 displays hazard ratios and 95% confidence intervals for each dimension added stepwise (Models 1–5) and the final full model (Model 6). The final full model includes all the variables across each of the social-ecological contexts. Significant effects are bolded.

Individual dimension. Analysis of individual-level factors over time (Model 1 in Table 2) revealed that the estimated hazard of gang entry among Latinx participants was nearly 2.5 times (hazard ratio [HR] = 2.41) that of African American participants. In terms of SES (higher scores on this measure are related to lower SES), the hazard of gang entry was 38% higher for individuals with lower SES in this sample. Among self-regulation characteristics, a unit increase in temperance (suppression of aggression and impulse control) was associated with a 43.8% decrease in the hazard of gang entry. Exposure to violence (i.e., witnessing violence and/or victim of violence) was associated with an 18% increase in the hazard of gang entry. Not surprisingly, self-reported offending (HR = 29.2) and time spent in jail (HR = 3.98) were the largest effects and independent predictors of subsequent gang entry. These results indicate that a 1-unit increase in self-reported offending was associated with a 29-times-higher hazard of gang entry and an almost 4-times-higher hazard of gang entry for individuals reporting more time spent in jail over the 7-year period.

Family dimension. Among factors measured for participants' parents, mothers' both alcohol and drug use were not significantly associated with gang entry. However, having a father who was arrested or jailed while participants were adolescents was associated with a 68% increase in the hazard of gang entry. Furthermore, higher parental hostility was associated with a 2.3-times-higher hazard of gang entry. See Model 2 in Table 2 for more details.

Peer dimension. Resistance to peer influence was a significant protective factor. More specifically, a 1-unit increase in resistance to peer influence was associated with a 31.4% decrease in the hazard of gang entry (Model 3 in Table 2). Individuals who reported associating with delinquent peers had a 2.60-times-higher hazard of entering a gang. Further, youth who had a higher proportion of friends who had been arrested had a 2.20-times-higher hazard of joining a gang over the 7-year study.

School dimension. Fighting at school, bullying perpetration, and teacher bonding were not significantly associated with gang entry (Model 4 in Table 2). However, school orientation acted as a significant protective factor, resulting in an approximately 60% decrease in the hazard of gang entry. This indicated that school orientation was a notably protective factor for youth gang entry.

Table 2. *Cox Regression Hazard Ratio Models (95% Confidence Interval [CI]) for Gang Entry*

Variables	Model 1 Individual dimension	Model 2 Family dimension	Model 3 Peer dimension	Model 4 School dimension	Model 5 Neighborhood dimension	Model 6 Full model
Individual						
Sex (reference = male)	.568 [.222, 1.45]					.468 [.105, 2.09]
Race (reference = Black)						
White	1.60 [.884, 2.90]					**3.30 [1.43, 7.65]**
Latinx	**2.41 [1.41, 4.13]**					**4.55 [2.10, 9.86]**
Other	.714 [.168, 3.03]					1.09 [.135, 8.77]
Socioeconomic status[a]	**1.38 [1.09, 1.75]**					1.21 [.887, 1.65]
Age of first offense	.984 [.857, 1.13]					.946 [.791, 1.13]
Onset of substance use	.902 [.781, 1.04]					1.05 [.869, 1.27]
PCL	.982 [.952, 1.01]					.980 [.940, 1.02]
PTSD	.773 [.302, 1.98]					.480 [.111, 2.08]
MDD	.669 [.257, 1.74]					.997 [.335, 2.97]
Moral disengagement	.974 [.935, 1.01]					.953 [.900, 1.01]
Violence exposure	**1.18 [1.06, 1.31]**					**1.22 [1.06, 1.40]**
Temperance	**.562 [.426, .743]**					**.675 [.468, .976]**
Offending	**29.2 [6.68, 128.1]**					**16.4 [2.30, 117.5]**
Emotion regulation	.935 [.700, 1.25]					1.12 [.760, 1.64]
Gun accessibility	1.08 [.851, 1.38]					1.29 [.936, 1.78]
Time spent in jail	**3.98 [2.36, 6.71]**					**4.87 [2.38, 9.98]**
Family						
Family hostility		**2.30 [1.21, 4.39]**				1.20 [.548, 2.63]
Parental monitoring		.656 [.423, 1.02][b]				**.549 [.325, .928]**
Father arrested		**1.68 [1.02, 2.77]**				1.10 [.631, 1.91]
Father drug problem		.791 [.519, 1.20]				.935 [.656, 1.55]
Mother drug problem		1.04 [.625, 1.73]				1.08 [.607, 1.91]
Mother alcohol problem		1.61 [.814, 3.17]				2.08 [.989, 4.38][b]
Peer						
Peer deviance			**2.60 [2.12, 3.19]**			1.28 [.912, 1.80]
Friend arrest			**2.20 [1.28, 3.77]**			1.92 [.958, 3.86]
Resistance			**.686 [.485, .970]**			.901 [.576, 1.41]
School						
Fighting at school				1.11 [.677, 1.83]		.851 [.443, 1.64]
Bullying perpetration				1.34 [.863, 2.09]		1.03 [.563, 1.89]
Teacher bonding				.918 [.653, 1.29]		.939 [.621, 1.42]
School orientation				**.397 [.274, .575]**		**.601 [.374, .965]**
Neighborhood						
Neighborhood disorganization					**1.30 [1.00, 1.68]**	1.18 [.791, 1.76]

Note. PCL = Psychopathy Checklist; PTSD = posttraumatic stress disorder; MDD = major depressive disorder. Bold indicates that the confidence interval does not include 0.
[a] Socioeconomic status was calculated such that higher scores indicate lower socioeconomic status.   [b] *p* = .05.

Neighborhood dimension. Only one variable was included at the neighborhood level. Neighborhood disorganization (Model 5 in Table 2) was associated with a 30% increase in the hazard for gang entry. This indicated that neighborhood disorganization was a risk factor for youth gang entry.

Social-Ecological Determinants Combined

Model 6 in Table 2 displays hazard ratios and confidence intervals for each dimension entered simultaneously. Individuals who reported higher exposure to violence had a 22% increase in the hazard rate. In terms of self-regulation, youth with higher internal emotionality (temperance) had a 32.5% decrease in the hazard of gang entry. Furthermore, individuals reporting more offending had a 16.4-times-higher hazard of gang entry, and those youth with more jail time had a 4.87-times-higher hazard of gang entry.

Interestingly, in the full model, only one of the family factors, parental monitoring, significantly predicted decreased hazard (45.1%) of gang entry. From the more distal dimensions (e.g., school and neighborhood), only school orientation remained a prominent factor, resulting in a 39.9% decrease in the hazard of gang entry while controlling for all the other variables.

Discussion

Using a sample of justice-involved youth who were convicted of serious offenses, the current study examined socioecological predictors of youth gang entry across 7 years using a survival model. This study offers a comprehensive examination of predictors both as isolated construct dimensions and in a competing model, where predictors identified throughout the literature were assessed collectively in one model (controlled for one another). In addition, these analyses clarify temporal relations among these variables and gang entry, which, because of practical limitations, have previously been studied with less rigor (i.e., cross-sectional designs). However, prevention work in practice hinges on preempting gang entry, highlighting the importance of temporality. Several risk and protective factors among various ecological contexts (individual, family, peer, school, neighborhood) were found to be associated with youth gang entry across the 7 years of the study.

What Social-Ecological Factors Predict Youth Gang Entry?

This study found several strong indicators for youth gang entry in each dimension of the social ecology (Models 1–5) that offer additional insight when compared with the full model (Model 6). At the individual level (Model 1), youth who were Latinx, were of lower SES, had witnessed or experienced violence, had committed prior offenses, or had previously spent time incarcerated were at a higher risk of gang entry across adolescence. In the comprehensive model (Model 6), which controlled for variables in all other dimensions, all of these variables remained significant predictors except for SES. This continuity indicates that Latinx ethnicity is a highly potent demographic marker of students who are recruited for gang membership, above and beyond SES, although it should be noted that the majority of the sample was low SES. Importantly,

we wish to clarify that ethnicity (and other demographics) are not inherently linked to gang involvement. Rather, the systems in which students operate (economic systems, education systems) have historically segregated and continue to segregate students based on ethnicity and SES, which has given rise to violent and unsafe phenomena that may create the need for protection and other benefits offered by gangs in these environments. Thus, students who belong to these demographic groups are also subject to recruitment or find membership attractive because of close others' modeled behavior or benefits, such as safety or social protection. Notably, moral disengagement and emotion regulation were not significant predictors across the models. This offers support against arguments that gang members are either choosing to mentally distance from their moral selves to avoid confronting or justifying immoral acts or are emotionally volatile (Alleyne, Fernandes, & Pritchard, 2014; Mallion & Wood, 2018). These findings support gangs as a complex social system that can be attractive or unavoidable for several reasons outside of emotionality or morality. These constructs should be further explored in the context of gangs as a community that is often modeled in a desirable way throughout a child's development, as well as the success with which forces such as school orientation and parental monitoring can compete. Finally, time spent in jail is a predictor that warrants further exploration to achieve a better understanding of how social dynamics in jail connect to life on the outside during reentry. For example, Scott (2018) found that incarcerated youth bring gang membership, violence, and rivalries into the detention center; however, more work is needed to better understand how time spent in jail or prison can influence gang entry.

Regarding the social dimensions (family, peer, school, and neighborhood), youth who reported a hostile family dynamic, had a father who had been arrested, had peers who engaged in persistent delinquency, and reported living in a disorganized neighborhood were also at a higher risk for gang entry. Students who reported high levels of school orientation were, by contrast, at a lower risk for gang entry, pointing to the protective effects of schools. Although these findings confirm much of what previous literature has found (Dishion, Véronneau, & Myers, 2010; Gordon et al., 2004; Howell & Egley, 2005), they extend past research and offer a more nuanced understanding of how these factors work during the transition from adolescence to young adulthood to increase the expectancy of gang involvement. Relying on Bronfenbrenner's (1977) social-ecological model, the findings indicate that all ecological contexts cannot be thought of as single variables, such as poverty, ethnicity, or school climate, but rather as a system that together increases the likelihood of gang involvement. Thus, a comparison to the full model (Model 6) illuminated several notable findings. First, when controlling for all variables, all family variables, including father arrests and family hostility, became insignificant, and parental monitoring emerged as the only significant family-level predictor of gang entry, such that students with parents who were highly involved or knowledgeable about their lives had a lower risk of gang entry. This is consistent with extant literature on the influential role of parental monitoring (Merrin, Davis, Berry, & Espelage, 2019; O'Brien, Daffern, Chu, & Thomas, 2013) but adds temporal clarity and points to the strong protective effect of parents while controlling for predictors across all ecological contexts.

Similarly, school orientation remained significant in the final model. This finding suggests that students who are highly oriented toward school, even considering all other predictors, are less likely to join a gang. This robust finding is also consistent with the literature that identifies related constructs, such as academic achievement and school climate, as widely protective against gang membership and violent behavior (among several deleterious outcomes for students; Merrin et al., 2015; O'Brien et al., 2013; Voisin & Elsaesser, 2016).

Taken together, these results acknowledge the importance of understanding risk factors across social contexts and point to the highly potent protective power of parental monitoring and school orientation. The full model (Model 6) indicated that even while facing several harmful risk factors, the odds of gang membership can be mitigated by taking steps to increase parental involvement and students' relationship with their school. Importantly, these key protective factors remained significant in our final model, whereas other contributors that have been established in the extant literature (e.g., neighborhood disorganization, SES) were no longer significant when controlling for all other variables. Perhaps most importantly, these results provide potentially efficacious actionable steps for parents and adult members of school communities.

Implications for Prevention and Intervention

The need for early prevention and intervention are clear. Many (but not all) of the variables identified as contributors to gang entry are identifiable in early childhood. This analysis examined effects over time; as such, it is also evident that more of these experiences lead to a higher likelihood of gang involvement, offering support for preventing, intervening, and suppressing the accumulation of these factors. Although this is easy to understand conceptually, these findings support efforts to ameliorate social-environmental factors.

Specifically, although several risk markers are unchangeable (e.g., ethnicity, witnessing violence), these results support parental monitoring and school orientation as malleable protective factors. Although we did not assess causality in the current study, given the greater literature, it is reasonable to believe that parental engagement and monitoring are a driving force for youth safety (Dishion & McMahon, 1998). Barriers to parental monitoring include working (often out of necessity) during hours when youth are not in school (Han, Miller, & Waldfogel, 2010), illness and substance misuse (Chen & Fish, 2013; Francis, 2010), and lack of skills or knowledge regarding how to effectively engage in the child's life (Stanton et al., 2000). Thus, policies related to improving or protecting workers' rights (e.g., wages, leave time, health-care benefits), removing barriers to health care and healthy living (e.g., cost of health care, culturally competent services, eradicating food deserts, providing access to safe outdoor gathering spaces, and affordable healthy food options), and providing parent skills training (e.g., parenting styles) have the power to contribute to a parent's ability to engage with and monitor a child's behavior to help prevent gang involvement.

Additionally, these findings reinforce the protective power of school orientation, suggesting that school policy should prioritize cultivating an enjoyable and safe learning environment for all students. There are many ways to achieve this goal that may vary based on unique community needs. However, empirical literature highlights two important components of facilitating school buy-in among students. First, school provides an opportunity for youth to build relationships with mentors and trusted adults; such relationships are at the center of all positive school-related academic and behavioral outcomes (Borman, Rozek, Pyne, & Hanselman, 2019; Meltzer, Muir, & Craig, 2018). Thus, school policies that intentionally facilitate this kind of contact can increase the chances that students encounter a trusted adult (i.e., teacher, staff member, counselor) with whom they want to build a relationship and from whom they can seek support and guidance. Second, policies that enforce and support culturally responsive teaching are also likely to increase student engagement. Culturally responsive teaching (also called *culturally sensitive* or *mindful teaching*; Woodley, Hernandez, Parra, & Negash, 2017) includes pedagogy, structure, and content components that foster growth and learning among all students and particularly among students who have been marginalized in educational settings (e.g., students of color, gender and sexual minority students, disabled students).

Limitations

Although the current study found several predictors of youth gang entry, several limitations should be noted. To begin with, we used a Cox regression to predict youth gang entry. Likely as a result of the high-risk sample, several individuals indicated that they were already in a gang at baseline (right-censored); as such, they needed to be removed from the study because of the modeling approach that was used to predict gang entry. Further, the sample included adjudicated youth from two locations in the United States (Maricopa County, Arizona, and Philadelphia, Pennsylvania). As such, the generalizability of the findings is limited, especially given that gangs tend to be racial or ethnically homogenous. Therefore, findings regarding race and ethnicity, and any practices that stem from unique cultural characteristics, may not be generalizable to other samples. Additionally, the sample was made up of mainly male participants. Although males report higher youth gang membership, females also play a significant role in the youth gang phenomenon (Peterson & Panfil, 2017). Future studies should use samples with a more substantial number of females to understand sex differences in the context surrounding gang entry and involvement. Further, it should be noted that the exposure-to-violence inventory and temperament measures had low Cronbach's alpha reliability coefficients and should be interpreted with caution. Finally, social-ecological analyses are typically modeled as multilevel models; however, the current study measured these contexts at the individual level.

Conclusions

Notwithstanding the aforementioned limitations, the current study provides a more nuanced understanding of the risk and protective factors for joining a gang. Rather than compare gang members to nongang members, the present study examined predictors of actual gang entry using a time-to-event model that provided new insights into the factors involved in adolescents' decision to join or resist gang membership. Notably, parental monitoring and school orientation were two vital protective factors associated with lower hazards of joining a gang. Prevention and

intervention efforts should target these areas early and frequently to help reduce youth gang involvement.

Keywords: youth gangs; social-ecological model; juvenile offenders; time-to-event model

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