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Developmental Pathways of Youth Gang Membership: A Structural Test of the Social Development Model

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Abstract

As a result of nearly 40 years of research using a risk and protective factor approach, much is known about the predictors of gang onset. Little theoretical work, however, has been done to situate this approach to studying gang membership within a more comprehensive developmental model. Using structural equation modeling techniques, the current study is the first to test the capacity of the social development model (SDM) to predict the developmental pathways that increase and decrease the likelihood of gang membership. Results suggest that the SDM provides a good accounting of the social developmental processes at age 13 that are predictive of later gang membership. These findings support the promotion of a theoretical understanding of gang membership that specifies both pro- and antisocial developmental pathways. Additionally, as the SDM is intended as a model that can guide preventive intervention, results also hold practical utility for designing strategies that can be implemented in early adolescence to address the likelihood of later gang involvement. Three key preventive intervention points to address gang membership are discussed, including promoting efforts to enhance social skills, increasing the availability of prosocial opportunities and rewarding engagement in these opportunities, and reducing antisocial socialization experiences throughout the middle- and high school years.

Keywords

Youth gang membership; Social development model; Developmental pathways; Structural equation modeling; Preventive intervention; Longitudinal study

Introduction

Scholarly inquiries of youth gang membership since the early 1980s have largely focused on identifying the risk and protective factors associated with youth gang membership and related delinquency and criminal offending. This is not surprising given the surge in media and public attention, statistical advances, and increased governmental funding during that time which promoted a risk and protective factors approach to gang research (Howell, 2003; Miller, 2001). Despite the rapid growth of research examining why youth join gangs, the translation of this research into effective gang prevention programs has been significantly slower (for a notable exception, see Esbensen, Peterson, Taylor, & Osgood, 2011; Esbensen, Osgood, Peterson, Taylor, & Carson, 2013). Consequently, prevention efforts are increasingly emphasizing the need for more research that can have direct implications for programming to help youth who are gang-involved or at-risk of involvement (Boxer, Kubik, Ostermann, & Veysey, 2015; Howell & Griffiths, 2016).

To date, little theoretical work has been done to situate the risk and protective factors approach to studying gang membership within a more comprehensive developmental model. However, for this knowledge to have utility, it is important to also understand the mechanisms by which the development of antisocial behavior (such as gang membership) is cultivated or inhibited. The social development model (Catalano & Hawkins, 1996; Hawkins & Weis, 1985) has been used to study several antisocial adolescent behaviors, including delinquency (Catalano, Park, Harachi, Haggerty, Abbott, & Hawkins, 2005; Deng and Roosa, 2007; Sullivan & Hirschfield, 2011) and violence (Catalano et al., 2005; Herrenkohl, Huang, Kosterman, Hawkins, Catalano, & Smith, 2001; Huang, Kosterman, Catalano, Hawkins, & Abbott, 2001; Kim, 2009), and could be a useful framework for understanding gang membership as well. The current study uses longitudinal data to test the capacity of the social development model to predict the developmental pathways that increase and decrease the likelihood of gang membership using relevant social development constructs.

Understanding the pathways that reduce risks and enhance protective influences to mitigate gang involvement has the potential to inform the development of targeted preventive intervention strategies.

Risk and Protective Factors Approach to Gang Involvement

It is imperative to understand why youth join gangs in order to develop successful prevention strategies. Fortunately, much work has been done to determine the risk and protective factors experienced in childhood that are predictive of gang membership in adolescence and early adulthood (Howell, Braun, & Bellatty, this journal issue). Risk factors are individual or environmental hazards that increase an individual's vulnerability to negative developmental outcomes (Shader, 2001). Initially, researchers used the risk factors approach to determine the factors predictive of adolescent drug use, general delinquency, and violence (e.g.,

Hawkins, Catalano, & Miller, 1992; Herrenkohl, Maguin, Hill, Hawkins, Abbott, & Catalano, 2000; Thornberry, Lizotte, Krohn, Smith, & Porter, 2003). Several longitudinal studies using large community samples have also examined the risk factors predictive of gang membership, including studies conducted in Seattle, Washington (e.g., Hill, Howell, Hawkins, & Battin, 1999), Rochester, New York (e.g., Thornberry, Krohn, Lizotte, Smith, & Tobin, 2003), Pittsburgh, Pennsylvania (e.g., Lahey, Gordon, Loeber, Stouthamer-Loeber, & Farrington, 1999), and Denver, Colorado (e.g., Huizinga, Weiher, Espiritu, & Esbensen, 2003). Each study includes a subsample of gang-involved youth from whom data were collected at various points across time. Analyses from these studies, as well as other gang research efforts, have produced three major findings with respect to the impact of risk factors on the likelihood of gang membership. First, gang involvement can be grouped into five developmental domains: individual characteristics, family, school, peer, and community (neighborhood) conditions (Howell & Egley, 2005). Second, risk factors have an additive effect; that is, the more risk factors a youth is exposed to, the more likely he or she is to join a gang (e.g., Esbensen, Peterson, Taylor, and Freng, 2010; Hill et al., 1999). Finally, the accumulation of risk factors interacting across multiple domains over time appears to further enhance the likelihood of gang membership (Thornberry, Krohn et al., 2003) – a key premise of Thornberry and Krohn’s interactional theory of gang membership (Thornberry, 2005; Thornberry & Krohn, 2001, 2005; Thornberry, Krohn et al., 2003).

While the utility of the risk factors approach in identifying targets for gang prevention strategies in specific domains of risk is unarguable, a limitation of the risk factors framework is that it is relatively atheoretical; namely, the risk factors approach itself does not integrate the various components across risk domains into a single, testable causal model. The social development model (Catalano & Hawkins, 1996), however, allows for the causal integration of various risk and protective factors into a coherent, testable model that can be applied to more holistically understand the developmental pathways resulting in various youth behaviors, including, we hypothesize, gang membership.

The Social Development Model

The social development model (SDM) organizes a broad range of risk and protective factors into a model specifying causal hypotheses to capture key elements of socialization. To do this, the SDM integrates features of three criminological theories that, individually, only partially account for observed processes in the etiology of delinquency: social learning theory, social control theory, and differential association theory.

Social learning theory (Akers, 1973; Bandura, 1977; Bandura & Walters, 1963) specifies the general social, emotional and cognitive learning mechanisms by which the rationalizations, norms, rules, and motivations of behavior are learned and perpetuated. Children learn patterns of behavior from socializing units of family, school, religious and other community institutions, and peers. The underlying socialization follows the same processes of social learning whether it produces prosocial or problem behavior. Children are socialized through processes involving four constructs: 1) opportunities for involvement in activities and interactions with others, 2) the degree of involvement and interaction, 3) the social, emotional and cognitive skills that are derived from social learning, which are necessary to

participate in these involvements and interactions and to access rewards from these interactions, and 4) the reinforcement resulting from performance in activities and interactions. When opportunities and skills are adequate and performance is rewarded, a social bond develops between the individual and the socializing agent, group or institution. Social learning theory informs the social development model by identifying which patterns of behavior are adopted, reinforced, and discouraged and the mechanisms by which these patterns occur. Specifically, the SDM hypothesizes that if prosocial interactions and involvement are experienced as rewarding, they reinforce the development of bonds to prosocial others and commitment to prosocial lines of action. Alternatively, if involvement and interactions with those engaged in antisocial behaviors are experienced as rewarding, they reinforce the development of bonds to antisocial others and perceptions that antisocial behavior will be rewarded.

Social control theory broadly refers to the regulation of behavior as a function of formal or informal social controls (Hirschi, 1969), and has been used to identify causal elements in the etiology of problem and positive behaviors. Controls are embedded within institutions that vary across people's lives, and may account for stability or change in antisocial behavior. Formal social controls are legally institutionalized, whereas informal social controls emerge from role relationships across key social institutions such as families, schools, peer networks, and community-based associations. Informal social controls emphasize the structure of interpersonal bonds linking individuals to each other and to other social institutions. Among youth, for example, weak ties to informal social control entities such as parents, school, and conventional peers increases the probability of the initiation and continuation of delinquent behaviors (Thornberry, Lizotte et al., 2003). The social development model incorporates a key perspective from social control theory by suggesting that, once strongly established, social bonds have the power to affect behavior by creating an informal control on future behavior (Catalano & Hawkins, 1996). Social bonds, as suggested by control theory, consist of attachment to others in the social unit and a commitment to, or investment in, the actions and beliefs of the socializing unit. The SDM hypothesizes that an individual's behavior will be pro- or antisocial depending on the predominant behaviors, norms, and values held by those to whom the individual is bonded (Catalano & Hawkins, 1996). SDM hypotheses depart from social control theory in two primary ways, suggesting 1) that bonds among typically prosocial entities (e.g., family) may in fact contribute to antisocial behavior if the beliefs and actions of that group are antisocial; and 2) that involvement, while playing a role in the theory, does not contribute to the social bond itself unless this involvement is recognized or rewarded.

Differential association theory (Cressey, 1953; Matsueda, 1982, 1988; Sutherland, 1973; Sutherland & Cressey, 1970) posits that delinquency is learned through interactions with others in a process of communication within intimate social groups. Under differential association theory, delinquency results from the cumulative exposure to individuals who engage in violations of the law relative to those who do not. Differential association theory is incorporated into the SDM as a driver for parallel, but separate, causal paths for prosocial and antisocial processes. While similar to social learning theory in that individuals learn non-normative behavior socially, differential association further hypothesizes that deviance results from an accrual of antisocial associations at a sufficient quantity and quality. For

example, an individual's antisocial bonds may override their prosocial bonds, pushing them towards a higher likelihood of engaging in antisocial behavior (Catalano & Hawkins, 1996). Each social path operates concurrently within the SDM, with antisocial bonds increasing the likelihood of antisocial behavior and prosocial bonds increasing the likelihood of prosocial behavior. The SDM includes pathways from antisocial rewards or antisocial beliefs to antisocial behaviors, which are distinct from the influences of deviant peers as postulated by differential association.

To summarize, the SDM is an integrated developmental theory that combines propositions of social learning, social control, and differential association theories to describe causal and mediating processes hypothesized to predict behavior over the course of development (Catalano & Hawkins, 1996; Hawkins & Weis, 1985). Children learn patterns of behavior, whether prosocial or antisocial, from socializing institutions (family, peers, school, community agencies, etc.). Socialization follows the same processes of social learning whether it produces prosocial or antisocial behavior. Specifically, children are socialized through processes involving four constructs: 1) opportunities for involvement in activities and interactions with others, 2) the degree of involvement and interaction, 3) skills to participate in these involvements and interactions, and 4) the reinforcement resulting from performance in activities and interactions. When opportunities and skills are adequate and performance is rewarded, a social bond develops between the individual and the socializing agent, group or institution. Once established, this social bond has the power to influence behavior by creating an informal control on future behavior. This control hinders or promotes deviant behaviors based on the individual's conformity to the norms and values of the socializing unit. Finally, an individual's behavior will be prosocial or antisocial depending on the predominant behaviors, norms, and values held by those to whom the individual is bonded.

Recognizing that many individuals experience both prosocial and antisocial influences, the SDM hypothesizes that an individual's behavior will be prosocial and/or antisocial depending on the degree of association with and bonding to prosocial and antisocial individuals and the adoption of associated beliefs. Thus, as illustrated in Figure 1, the SDM hypothesizes two parallel development pathways leading to prosocial and antisocial outcomes (Catalano & Hawkins, 1996; Hawkins & Weis, 1985). The prosocial path specifies how protective processes of opportunities, involvement, skill development, and recognition for prosocial behavior build prosocial bonds and beliefs or norms that are protective against antisocial behavior. The antisocial path specifies how risk factors interact in processes similar to those operating on the prosocial path to produce antisocial behavior. The constructs that form these paths are the same except those on the prosocial path are operationally protective factors and those on the antisocial path are risk factors. Opportunities, involvement, skills, and rewards are the fundamental building blocks of the model. From here, the SDM hypothesizes that the interplay of specific factors during development influence the degree to which children develop bonds to social institutions. Bonding subsequently affects the individual's beliefs in the moral order, which in turn, affects behavior. On the antisocial path, the model also hypothesizes direct paths from 1) antisocial rewards to antisocial behavior, and 2) antisocial bonding to antisocial behavior.

It is also important to note that the SDM hypothesizes a sequence of processes in each of a series of sub-models specific to stages of development ranging from early childhood through adolescence that lead to behavioral outcomes through the cumulative effects of prosocial and antisocial influences. The model also allows for the examination of exogenous factors including position in the social structure (including age, race, gender, and socioeconomic status), individual characteristics (e.g., cognitive ability, poor concentration, early aggressiveness), and external constraints (e.g., formal and informal parent, school, and legal constraints on behavior). The SDM hypothesizes that these exogenous factors are mediated by the processes of socialization or social development that occur along the two major pathways of the model (Catalano & Hawkins, 1996).

Prior Tests of the SDM

Full model tests using structural equation or latent modeling techniques have provided empirical support for the SDM's ability to predict a number of delinquent behaviors in adolescence and early adulthood. These include substance use, misuse, and dependence (Brown, Catalano, Fleming, Haggerty, & Abbott, 2005; Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Catalano et al., 2005; Fleming, Brewer, Gainey, Haggerty, & Catalano, 1997; Kosterman, Hill, Lee, Meacham, Abbott, Catalano, & Hawkins, 2014; Lonczak, Huang, Catalano, Hawkins, Hill, Abbott, Ryan, & Kosterman, 2001; O'Donnell, Hawkins, & Abbott, 1995; Sullivan & Hirschfield, 2011); delinquency and antisocial behavior (Brown, Catalano, Fleming, Haggerty, & Abbott, 2005; Catalano et al., 2005; Kosterman, Haggerty, Spoth, & Redmond, 2004; Sullivan & Hirschfield, 2011); violence (Catalano et al., 2005; Herrenkohl et al., 2001; Huang et al., 2001; Kim, 2009); school problems (Catalano et al., 2005); and other child problem behavior (Catalano, Oxford, Harachi, Abbott, & Haggerty, 1999; Fleming, Catalano, Oxford, & Harachi, 2002; Sullivan & Hirschfield, 2011). Partial tests of the SDM have also provided empirical support for the model's predictive ability to identify causes of school problems (Kim, 2000); substance use (Choi, Harachi, Gillmore, & Catalano, 2005; Kim, 2000); delinquency and antisocial behavior (Deng & Roosa, 2007; Kim, 2000); aggression (Deng & Roosa, 2007; Kim, 2000); externalizing behavior (Roosa, Zeiders, Knight, Gonzalez, Tein, Saenz, O'Donnell, & Berkel, 2011); and violence (Choi et al., 2005) in diverse samples.

While the SDM as an integrated model has yet to be applied to the study of gang membership, key tenets of social control, social learning, and differential association theories have independently been supported in explaining onset, or other aspects, of youth gang membership. For instance, social control theory has been used to predict the onset of gang membership (Thornberry, 2006), determine the correlates of gang membership (Brownfield, 2003, 2010; Brownfield, Thompson, & Sorenson, 1997), and assess the relationship between youth gang involvement and criminal and delinquent behaviors (Cepeda, Onge, Notwotny, & Valdez, 2016). In a similar fashion, social learning theory has also been used to understand the correlates of gang membership (Brownfield et al., 1997), while also distinguishing gang from non-gang youth, particularly in relation to higher rates of group-based offending (Winfrey, Backstrom, & Mays, 1994; Winfree, Mays, Vigil-Backstrom, 1994) and substantial increases in violent delinquency (Thornberry, Krohn, Lizotte, & Chard-Wierschem, 1993). Researchers have also used measured constructs of

differential association independently to determine the correlates of gang membership (Brownfield, 2003; Winfree, Backstrom, & Mays, 1994; Winfree, Mays, Vigil-Backstrom, 1994). The synthesis of these theories within the SDM framework has the potential to contribute further to understanding of why youth join gangs.

Current Study

Various studies have demonstrated empirical links between SDM constructs and youth behavioral outcomes. Studies have also shown the practicality of applying the SDM's three underlying theories to studying gang membership in youth samples. Taken together, the theoretical and empirical literature supports the application of the SDM to examine the precursory paths leading to gang membership. The SDM is an appropriate theoretical model to examine gang membership because it incorporates relationships among a set of empirically derived risk and protective factors, most of which have been shown to predict gang membership (e.g., Hill et al., 1999). Consequently, the current study is a test of the SDM to assess the degree to which the model is able to explain the developmental paths leading to gang membership, taking into account the degree to which violence earlier in childhood (an indicator of prior antisocial behavior) affects these processes.

Methods

Sample

Data for the current study are drawn from the Seattle Social Development Project (SSDP). SSDP is a longitudinal study following respondents prospectively from age 10 into adulthood. Participants were from 18 Seattle elementary schools that served students from high-crime neighborhoods, as indicated by statistics obtained from the Seattle Police Department. The schools represented approximately 25 percent of the total number of elementary schools in Seattle at the time, and the study population included all fifth-grade students in these schools (N = 1,053). From this population, 808 students and their families consented to participate in the study. During elementary school the Seattle School District used mandatory busing to achieve racial equality in schools. As a result, the sample also included students from other neighborhoods in the city. This sample represented 77 percent of the population of fifth graders targeted for participation.

Of the 808 students, 396 (49 percent) were female, 381 (47 percent) were Caucasian American, 207 (26 percent) were African American, 177 (22 percent) were Asian American, 43 (5 percent) were Native American, and the remaining 26 students were of other ethnic backgrounds. Of these, approximately 5 percent also self-identified as Hispanic. A majority of the participants were from low-income households. More than half of the student sample (52 percent) had participated in national free or reduced school breakfast/lunch program at some point in the fifth, sixth, or seventh grade. Alongside this, a significant majority of participants were from low-income households – 46 percent of parents reported a maximum family income of less than \$20,000 per year in 1985.

The SSDP panel was interviewed annually from the fifth grade (in 1985) through tenth grade, in the 12th grade, and every three years until the present. Retention rates for the

sample have averaged 90% since the onset of the study. In addition to interviews of panel members, SSDP also interviewed parents and teachers, and collected information regarding respondents from school records. All data collection procedures were approved by the University of Washington Human Subjects Review Committee.

With the exception of the gang measure (described below), the analyses of social developmental processes presented here examine data collected in the spring of 1988, 1989, and 1991, when participants were aged 13, 14, and 16 years, respectively. One respondent was identified as an outlier in preliminary analyses, uniformly answering “110 times” across a number of measures of major delinquency at age 18. Consequently, the respondent was dropped from further analysis. This decision aligns with other SDM tests using the SSDP sample (e.g., Huang et al., 2001; Lonczak et al., 2001). The final sample size for the current analysis is 807.

Measures

Gang membership—The use of self-report measures for determining gang involvement has been widely supported in the field of youth gang research (e.g., Boxer, Veysey, Ostermann, & Kubik, 2015; Bjerregaard & Smith, 1993; Dishion, Patterson, Stoolmiller, & Skinner, 2005; Esbensen, Winfree, He, & Taylor, 2001; Fox, Lane, & Akers, 2010; Klein, 1995; Tapia, 2011; Thornberry, Krohn et al., 2003). In the current study, self-reported gang membership was measured prospectively from 7th to 10th grade, in 12th grade, and subsequently every three years in adulthood. Participants were asked, “Do you belong to a gang?” followed by “What is the name of the gang?” The latter question was used to distinguish gangs from informal peer groups – a common surveying tactic that is used to obtain the most reliable self-report data on gang involvement possible (Esbensen et al., 2001). The most commonly named gangs in the sample were the Bloods, the Crips, and the Black Gangster Disciples. Gang names were vetted in conjunction with the King County Gang Task Force, and only names deemed credible were used. Initially, youth who reported that they were a member of a gang and could provide a credible name were coded as belonging to a gang. Slight inconsistencies in reporting occurred over time, particularly when respondents were at ages 21 and 24 years, and were asked if they had ever belonged to a gang and the age when they first joined. Sensitivity analyses conducted on the sample revealed 1) no significant differences on an index of childhood risk for those who reported ever joining a gang and later changed their response from those who consistently reported membership, and 2) significant differences for all those who ever reported membership compared with those who had never reported membership (for results of these analyses, see Gilman, Hill, Hawkins, Howell, & Kosterman, 2014). As a result, respondents were coded as having joined a gang (1 = yes) if they ever reported having done so, either prospectively or retrospectively. Within the analysis sample, 21 percent (n = 172) of respondents ever reported joining a gang.

Prior violent behavior—Three indicators of self-reported violent behavior in the past year at age 13 were used in the current analyses. These items include picking a fight with someone, hitting someone with the intention of hurting, and beating someone so badly that a doctor’s help was needed. Taken together, these indicators have been conceptually

considered to be progressively more severe forms of “street” violence (Huang et al., 2001). To address skewness, the violence items were log-transformed prior to standardization. One latent variable –prior violent behavior – comprised of the three indicators was specified by the model.

SDM constructs—The SDM is a theory of general prosocial and antisocial processes which posits that socialization manifests as opportunities, involvement, rewards and bonding (Catalano & Hawkins, 1996). Following the theory and methodology from prior SDM tests (e.g., Huang et al., 2001), a reflective measurement approach was taken to identify latent variables specified by the model. Reflective measurement – where causality flows from the latent construct to the indicators – assumes that a change in the indicator(s) reflects a change in the latent construct (Coltman, Devinney, Midgley, & Venaik, 2008). All model constructs related to the SDM were measured during the middle school and early high school periods when respondents were between the ages of 14 and 16. Latent variables specified by the model on the prosocial and antisocial paths include opportunities, involvement, rewards, and bonding. Each of these latent variables includes indicators spread across four domains of influence: community, school, family, and peer. Latent variables representing antisocial opportunities, involvement, rewards, and bonding were created in a similar fashion. The rationale for this approach was to create indicators that represented a cross-domain composite of a youth’s perceptions, attitudes, beliefs, and socialization experiences. This methodology emphasizes multidomain indicators of a single (latent) concept, and has been used in prior tests of the SDM (e.g., Huang et al., 2001; Lonczak et al., 2001). Additionally, latent variables representing skills for interaction and beliefs in prosocial values were created and included in the analysis models. All items were coded so that higher scores reflect more of the indicated construct, then standardized to account for variation in item scaling prior to scale creation. If a participant had complete data on at least half of the items composing the indicator, the mean of the standardized scores was computed as the value of the indicator. Ultimately, the model constructs used in the current analyses were indicated by three scales. Model constructs and sample items are provided in Table 1 (all items are available from the first author).

Gender, ethnicity and socioeconomic status—As indicated in Figure 1, the SDM permits examination of exogenous factors, such as position in the social structure, that are hypothesized to influence the socialization process (Catalano & Hawkins, 1996). The current model test accounts for position in the social structure by controlling for gender, ethnicity and socioeconomic status in the identified paths. This decision is further supported by the fact that being male, nonwhite, and from a low socioeconomic background have been shown to be significantly correlated with gang membership in the SSDP sample (e.g., Gilman, Hill, Hawkins, Howell et al., 2014). Gender is coded as a dichotomous variable, where 1 = male and 0 = female. Ethnicity is included in the models as three dummy variables (1 = yes) for African American, Asian American, and Native American, with Caucasian set as the referent group. Socioeconomic status is a composite of standardized measures of parental education (mother’s and father’s) and per capita household income in the 5th and 6th grades, as well as the child’s eligibility for participation in the national free or reduced school breakfast/lunch program in the 5th, 6th, and 7th grades.

Analytic Procedures

Model analyses were conducted in Mplus version 7 (Muthen & Muthen, 2012). Structural equation modeling (SEM) typically includes two analytic components: a measurement model (confirmatory factor analysis, CFA) and a structural model (structural equation model, SEM) (Buhi, Goodson, & Neilands, 2007). The initial model test is modeled after a prior test of the SDM (Huang et al., 2001) with two notable exceptions: 1) gang membership is the primary outcome of interest and 2) gender and ethnicity are included as control variables not only in the direct path to gang membership, but also in the direct paths in the front of the model as hypothesized by the SDM (for example, gender and ethnicity are included in the direct paths to violent behavior, skills, prosocial socialization, and gang membership in the final second-order model). Because the primary model constructs are the same, CFA results are not provided for the structural models here, except to note that the model fit statistics for the CFA analyses conducted by Huang and colleagues (2001) suggest the measurement models fit the data well (first-order CFA model: $\chi^2 = 1168.32$ (df = 559, n = 807), CFI = 0.96, RMSEA = 0.04; second-order CFA model: $\chi^2 = 1376.80$ (df = 588, n = 807), CFI = 0.95, RMSEA = 0.04).

Structural models—Modeling proceeded in three steps. First, a model was examined that reflected the SDM as specified in Figure 1. Next, following examination of modification indices, and discussion, a revised model was examined that included some additional paths and factor intercorrelations. Finally, the revised SDM was also examined as a second-order model due to the high correlations among opportunities, involvement and rewards which were included in a single socialization factor for each of the two paths (antisocial and prosocial). Since gang membership was assessed cumulatively, to test the time-ordering of the model, sensitivity analyses were run excluding youth who joined a gang prior to age 14. Model fit and path estimates resulting from this analysis were similar to the model results using the full sample. As a result, the final models presented here include all 807 cases.

In the first- and second-order structural models, factor loadings were allowed to freely vary with one referent indicator on each factor set to 1.00 to identify the metric of the latent variables. In the revised model, four pairs of indicator error terms were allowed to correlate to account for parallel items contained in the corresponding indicators (the four pairs were the error terms for V10 and V13, V25 and V28, V26 and V29, and V27 and V30 – these correspond to factors listed in Table 3 in the results section). Additionally, the four pairs of error terms for the corresponding prosocial and antisocial factors (e.g., prosocial opportunities with antisocial opportunities) were also allowed to freely correlate. These correlations were added to account for the conceptual correspondence between the constructs, a technique used in prior SDM tests using SSDP data (e.g., Huang et al., 2001; Lonczak et al., 2001). In line with the above procedures, the residuals for the two higher-order socialization constructs (prosocial socialization and antisocial socialization) were also allowed to freely correlate in the second-order model. All theory-based path coefficients between factors were freely estimated.

As specified by the SDM, gender (one dichotomous variable), ethnicity (three dummy variables), and socioeconomic status were included as control variables in the direct paths to

1) prosocial opportunities, prosocial rewards, antisocial opportunities, and antisocial rewards in the first-order model, and 2) prior violence, skills, and prosocial socialization in the revised and second-order model. Additionally, gender, ethnicity, and socioeconomic status were also included in the model as control variables in the direct path to gang membership. Consequently, all direct effects on gang membership control for gender, ethnicity, and socioeconomic status.

Based on recommendations in the field, overall model fit was assessed using the chi-square model fit, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) (Bentler, 1990; Bollen, 1989; Bollen & Lennox, 1991; Buhi et al., 2007; Browne & Cudeck, 1993; Hu & Bentler, 1999). Chi-square ratios (χ^2 / df) between 2 and 5 have been employed in health behavior research to determine a good fitting model (Buhi et al., 2007). Values of 0.95 or greater for the CFI/TLI (Hu & Bentler, 1999) and 0.05 and lower for the RMSEA (Bollen, 1989; Browne & Cudeck, 1993) indicate a good model fit and have been recommended by scholars employing SEM techniques. Others have suggested that a cutoff value of 0.90 or greater for the CFI indicates an adequate fit (Newcomb, 1990). While little consensus exists with regards to viable cutoff values for determining good model fit, the aforementioned standards have been routinely applied in the social and health sciences (Buhi et al., 2007).

Missing data—Little sample attrition occurred over the course of the study. Of the 808 who began the study at age 10, 778 (96%) were interviewed at age 14, 770 (95%) were interviewed at age 16, and 757 (94%) were interviewed at age 18. To avoid any potential bias associated with deletion or mean substitution procedures, missing data were addressed in Mplus using maximum likelihood estimation with robust standard errors (MLR). Maximum likelihood estimation was chosen to address missing data in order to obtain the best estimates of the relationships between variables using all available data without deleting cases. Utilizing this method preserves the natural variability in the data so that the presented estimates are not biased (Graham, 2009), and is a substantial improvement over traditional approaches (i.e., listwise or pairwise deletion, mean or regression substitution) when missingness cannot be avoided (Acock, 2005).

Results

Factor intercorrelations are presented in Table 2 (correlations, means and standard deviations for measured variables are available from the first author). Measures indicating the same factor were highly correlated in each case. With three exceptions – prosocial opportunities with violence; antisocial bonding with prosocial opportunities; and antisocial bonding with prosocial socialization – the majority of coefficients were in the expected direction, with positive correlations among prosocial constructs and negative correlations between prosocial constructs and antisocial constructs. Results suggest that, in general, the scales indicating each factor share substantial common variance, and that relationships among factors are consistent with hypothesized distinctions between prosocial and antisocial constructs within the model.

As indicated in Table 3, all factor loadings for the first- and second-order model factors were significant and in the expected direction.

First-Order Factor Model

The initial first-order model was tested by including structural paths hypothesized by the SDM a priori. Taken together, results from this initial test suggest a poor-to-modest fit of the data; $\chi^2 = 2128.80$ (df = 650, n = 807), CFI = 0.88, TLI = 0.86, RMSEA = 0.05 (95% CI: 0.051 – 0.056). While the SDM specifies that antisocial behavior in prior developmental periods affects later behavior only as it is mediated by opportunities in the subsequent period, we revised the first-order model to include an alternative hypothesis (e.g., Loeber, 1996; Huang et al., 2001) of an unmediated path from violent behavior at age 13 to later gang membership. We also tested a direct path from violence at age 13 to skills, and from skills to pro- and antisocial opportunities as supported by findings from dynamic transactional theories of delinquency (e.g., Dishion, Patterson, Stoolmiller, & Skinner, 1991; Granic & Patterson, 2006; Lytton, 1990; Patterson, Debaryshe, & Ramsey, 1989; Sameroff, 2009). The revised model fit the data better than the traditional model tested a priori, with model fit statistics reaching acceptable values; $\chi^2 = 1651.68$ (df = 609, n = 807), CFI = 0.91, TLI = 0.90, RMSEA = 0.05 (95% CI: 0.043 – 0.049). Additionally, results from a chi-square difference test between the a priori (original theory) and revised models suggest that the inclusion of three alternative paths significantly improved the fit of the model ($\chi^2 = 788.64$, df = 4, p-value < .001).

Figure 2 presents the estimated path coefficients for the revised first-order model including the alternative hypothesized paths directly from violence to gang membership, violence to skills, and skills to opportunities. All but three paths specified by SDM were significant and in the expected direction. With the exception of the paths from violence at age 13 to prosocial opportunities (significant, positive effect), from antisocial involvement to antisocial rewards (non-significant), and antisocial bonding to prosocial beliefs (non-significant), all SDM hypotheses were supported. Although the factor intercorrelation between violence at age 13 and prosocial opportunities was near zero and non-significant ($r = .01$, nonsig), the association between violence at age 13 and prosocial opportunities became positive in the context of other variables in the model (control variables for this path include skills, gender, race, and socioeconomic status), suggesting a suppressor effect (MacKinnon, Krull, & Lockwood, 2000; Pandey & Elliott, 2010). Additionally, results provide evidence for the alternative hypotheses suggesting prior violent behavior predicts lower skills at age 14 ($b = -.28$, $p < .001$), and that, in turn, higher skills predicted significantly more prosocial opportunities ($b = .63$, $p < .001$), fewer antisocial opportunities ($b = -.61$, $p < .001$), and a 3.17 increase in the odds of later gang membership as a result of early delinquency (i.e., violent behavior).

In the interest of parsimony, the effects of gender, ethnicity, and socioeconomic status are not presented in Figure 2. However, results suggest that being male (compared to female) is significantly related to reductions in skills and antisocial opportunities, as well as increases in violent behavior, prosocial rewards, and the odds of joining a gang (OR = 4.57, $p < .001$). Being African American (compared to Caucasian) is significantly associated with an

increase in antisocial opportunities, antisocial rewards, skills, prior violence, and gang membership (OR = 2.54, $p < .001$); being Asian American is associated with increased skills and gang membership (OR = 1.99, $p < .05$) compared to Caucasian; and being Native American is associated with increased odds of gang membership (OR = 4.78, $p < .01$). Higher socioeconomic status is significantly associated with increased prosocial opportunities and prosocial rewards, and reductions in antisocial opportunities, prior violence, and gang membership (OR = 0.61, $p < .001$). Path estimates for the effects of gender, ethnicity and socioeconomic status on model constructs for the first-order model are available from the first author.

Second-Order Factor Model

Results from prior tests of the SDM suggest that model fit may be improved if the opportunities, involvement, and rewards constructs are modeled as second-order factors representing more general socialization processes – prosocial socialization and antisocial socialization (e.g., Catalano et al., 1996; Huang et al., 2001; Lonczak et al., 2001). While distinguishing between the distinct prosocial and antisocial socialization constructs (opportunities, involvement, and rewards) allows for conceptual and practical applications of the theory, these constructs have also been shown to be highly correlated in the SSDP data (Huang et al., 2001; Lonczak et al., 2001). As a result, modeling second-order factors is advantageous in the current analysis because 1) it allows us to capture the substantial common variance in opportunities, involvement, and rewards, and 2) test direct links to gang membership from the socialization experience in general rather than requiring it to be mediated through rewards and bonding exclusively. Although the SDM hypothesizes that rewards mediate the effects of opportunities and involvement in specific situations (Catalano & Hawkins, 1996), the data for these analyses are based on annual assessments and do not allow for a robust test of this aspect of the theory. As a result, the use of second-order socialization factors has been considered a more appropriate fit for the current data (e.g., Huang et al., 2001).

The overall fit of the model improved with the addition of the second-order socialization factors; $\chi^2 = 1594.79$ (df = 616, $n = 807$), CFI = 0.92, TLI = 0.91, RMSEA = 0.04 (95% CI: 0.042 – 0.047). Results from a chi-square difference test between the first- and second-order models suggest that the inclusion of second-order socialization factors significantly improves the model fit ($\chi^2 = 41.95$, df = 9, $p\text{-value} < .001$). As indicated in Figure 3, all theory-based path coefficients were significant and in the expected direction, with two exceptions: the path from violence at age 13 to prosocial socialization, and the path from bonding to antisocial others to gang membership. Neither of these paths reached statistical significance. Additionally, while in the expected direction, the path from antisocial bonding to prosocial beliefs was also not statistically significant. For clarity, the effects of gender, ethnicity, and socioeconomic status are not presented in Figure 3, but are provided in Table 4. In this model, being male is significantly associated with increased prior violence and gang membership (OR = 5.01, $p < .001$), as well as decreased skills. When compared with Caucasian, being African American is significantly associated with increased prior violence, skills, and gang membership (OR = 2.33, $p < .01$); being Asian American is associated with increased skills and gang membership (OR = 2.44, $p < .01$), and decreased prior violence;

and being Native American is associated with gang membership ($OR = 3.72, p < .01$). Higher socioeconomic status is associated with decreased prior violence and gang membership ($OR = 0.64, p < .01$), as well as increased prosocial socialization.

Overall, results from the final second-order model indicate that both prosocial socialization and antisocial socialization (as specified by the SDM) are predictive of gang membership. The prosocial path aligns with the hypotheses specified by the SDM, as we see a significant and negative path from prosocial socialization to gang membership through bonding to prosocial others and beliefs in prosocial values. Antisocial socialization is also predictive of gang membership, but had a direct positive effect, rather than an indirect effect through bonding to prosocial others. Both the prosocial and antisocial path are significantly affected by prior violent behavior through skills. Prior violent behavior, however, does not remain predictive of gang membership after controlling for gender, ethnicity and socioeconomic status. An effects decomposition identified two statistically significant indirect pathways from violence at 13 to gang membership: violence at 13 $\rightarrow$ antisocial socialization $\rightarrow$ gang ($p < .01$) and violence at 13 $\rightarrow$ skills $\rightarrow$ antisocial socialization $\rightarrow$ gang ($p < .01$). These results suggest that the most salient pathways to gang membership in the second-order model were the antisocial socialization pathway and the pathway through skills and antisocial socialization.

Discussion

The current test of the SDM to predict gang membership is an important contribution to the available theoretical and empirical literature on youth gang membership. Various studies have demonstrated empirical links between SDM constructs and youth behavioral outcomes (e.g., Brown, Catalano, Fleming, Haggerty, Abbott, Cortes, & Park, 2005; Catalano et al., 1996; Catalano et al., 2005; Herrenkohl et al., 2001; Huang et al., 2001; Fleming et al., 1997; Lonczak et al., 2001), and while the SDM's three underlying theories have been applied to study gang membership independently, the current study is the first to apply the SDM as an integrated theory to examine the developmental pathways beginning at age 13 that are predictive of gang membership. Results from the structural model tests presented here suggest that the SDM provides a good accounting of the social developmental processes that predict gang membership, despite the potential temporal constraints of study constructs (detailed further below). Taken together, study findings support the promotion of a theoretical understanding of gang membership that specifies social development pathways, while holding practical utility for designing preventive intervention strategies in early adolescence to address the likelihood of later gang involvement in high risk samples.

Potential Model Modifications

A test of the fit of the structural paths as originally hypothesized by the social development model using multiple indicators of latent constructs demonstrated a moderate fit for the data. Subsequently, we revised the model to include three alternative hypotheses: 1) a direct path from violent behavior at age 13 to gang membership, 2) a direct path from violent behavior to skills for interaction, and 3) direct paths from skills for interaction to pro- and antisocial opportunities. The revised model fit the data better, and provided empirical support for the

addition of the alternative hypotheses. The addition of these paths is also theoretically supported in the literature on child-driven processes. Specifically, prior theory and research have supported the inclusion of child-driven processes such that more socially skilled children, for example, are also likely to have more prosocial opportunities and fewer antisocial opportunities (Granic & Patterson, 2006; Lytton, 1990; Patterson et al., 1989; Sameroff, 2009). Future applications of the model to study the developmental pathways of gang membership should consider including the child-driven paths proposed here.

Further, although ethnicity and gender were included as control variables, we did not examine whether the SDM processes varied by ethnic and gender groups. Despite increasing rates of female gang involvement, research on girls and gangs is still in its infancy, and little theoretical developments have been made to explain the unique processes by which girls join gangs (Howell & Griffiths, 2016). Results from the second-order model suggest that boys are five times more likely to join gangs compared to girls within the social development framework. It is possible that alternative mechanisms than those specified by the SDM will better explain the developmental pathways that result in gang membership for girls specifically. Future theory development and research efforts for exploring how and why girls join gangs is needed to advance our knowledge around gangs and girls more generally. While some theoretical work has been done to help explain the processes resulting in gang membership for youth in ethnically marginalized communities (see Vigil's work on multiple marginality, 1988, 2002; Vigil & Yun, 2002), the literature is still rather unclear on whether the developmental pathways resulting in gang membership differ across various ethnic groups. Given this observation, it would be important for future SDM tests to assess whether the SDM pathways predicting gang membership are moderated by ethnicity specifically. This is particularly salient given the significant relationships between all three ethnic groups (African American, Asian American, and Native American) in predicting higher odds of gang membership compared to white youth after controlling for other model constructs. In the final second-order model, we found significant, positive relationships between being African American and Asian American (compared to whites) and skills for interaction as well as gang membership (for reference, see Table 4). This is an interesting finding that also warrants further examination, and highlights the importance of determining whether different mechanisms of socialization result in gang membership for different groups. Overall, additional efforts are needed to clarify the mechanisms of socialization that result in gang membership for girls specifically, as well as those pathways that result in gang membership for ethnically diverse groups.

Informing Preventive-Intervention Efforts

The SDM is intended as a model to guide the development of preventive interventions. While each of the SDM constructs is a potential focus for prevention to reduce the likelihood of gang membership, results from these analyses suggest a number of points for preventive intervention worth noting. First, in the final second-order model, skills for interaction at age 14 was significantly and positively related to prosocial socialization and negatively related to antisocial socialization, which, in turn, both significantly affected youths' risk of joining a gang in the expected directions. Additionally, we found a significant, negative relationship between prior violence and skills and between skills and subsequent pro- and antisocial

opportunities. These results suggest the importance of addressing early violence onset as well as enhancing subsequent skills for interaction with others to promote greater prosocial socialization while simultaneously reducing antisocial socialization, particularly for youth already engaged in antisocial behavior in the periods of late childhood and early adolescence. This finding is encouraging because skills are modifiable characteristics. Because skills are malleable, promoting skills development is a promising point for intervention efforts. In fact, this aligns with a more general push in the field of juvenile justice to promote therapeutic interventions that aim to enhance socio-emotional and behavioral skills to reduce problem behaviors such as recidivism (Howell, Lipsey, & Wilson, 2014; Walker & Bishop, 2016).

These conclusions also align with those made by evaluators of the Gang Resistance Education and Training (G.R.E.A.T.) program. After a rigorous longitudinal evaluation showed no effects of G.R.E.A.T. on violence, delinquency, or gang involvement, the program curriculum was revised to more directly focus on youth skill-building through interactive teaching techniques (Esbensen et al., 2011). An updated evaluation of the G.R.E.A.T. program, which utilized a randomized experimental design, found a significant reduction in gang involvement for the treatment versus the control group for four years post-treatment (Esbensen et al., 2011; Esbensen et al., 2013). Thus, it appears that skill-building, such as teaching refusal skills and conflict resolution skills, is a valuable component to gang prevention efforts. The results of our study strongly suggest that the importance of these skills could be in their ability to facilitate prosocial socialization and avoid antisocial socialization to mitigate gang involvement.

The second practical conclusion that can be drawn from the current study is the importance of prosocial socialization processes. While much of the gang literature focuses on risk factors, results from the current study suggest significant, positive relationships among factors across the prosocial pathway (prosocial opportunities → bonding → beliefs in prosocial values), which culminate in a reduction of the odds of gang membership. Not surprisingly, we also see positive relationships among the prosocial socialization factors, with higher beliefs in prosocial values resulting in reduced odds of gang membership in the second-order model. This suggests that prevention efforts aimed at reducing the likelihood of gang membership should find viable ways to increase the availability of prosocial opportunities for involvement in family and friend groups, schools, and neighborhood activities. Further, rewards for engaging in these prosocial opportunities should be enhanced, in addition to encouraging the development of prosocial beliefs that align with the values associated with prosocial environments. Results also suggest that beliefs can be influenced by increasing the availability of prosocial opportunities in youth's lives. This is particularly salient because beliefs are often thought of as difficult to change, yet our findings suggest that youth's values can be influenced by providing them with prosocial opportunities and rewards that encourage them to continue on the prosocial pathway.

While results suggest that the likelihood of gang membership can be mitigated by prosocial socialization experiences, model results also suggest that antisocial socialization processes increase the odds of gang membership. It is noteworthy that no relationship was found between antisocial involvement and antisocial rewards in the first-order model. However, a

strong, direct effect of antisocial socialization processes on gang membership in the second-order model suggests that the combination of multiple antisocial socialization experiences (opportunities, involvement, and rewards) across an array of domains (family, school, neighborhood, peer) is more highly predictive of gang membership than any one factor independently. These results align with other studies suggesting that the interaction of risk factors in multiple domains produces the greatest risk of gang membership (Thornberry, Krohn et al., 2003). Aiming to reduce antisocial socialization experiences may prove fruitful in interrupting the trajectory toward gang membership for youth who experience antisocial socialization in late childhood and early adolescence.

While bonding to antisocial others was directly related to gang membership in the first-order model, no significant relationship was found between antisocial bonding and gang membership in the second-order model. Although bonding to antisocial others has been shown to be a predictor of delinquent behavior in this sample (e.g., substance use, Catalano et al., 1996), it only had a slight indirect effect (through beliefs) on gang membership in the final model. On the antisocial path, only antisocial socialization and violent behavior had direct effects on gang membership. Attachment and commitment to peers involved in antisocial behaviors appears to reduce one's belief in prosocial values, whereas gang membership may stem more directly from prior delinquent behavior, engagement with antisocial environments, and the perception that antisocial behavior is rewarding. In the current analyses, gang membership appears to be affected by the strength or weakness of the bonds one has with others engaged in antisocial behavior only to the extent to which these bonds diminish beliefs in prosocial values. This suggests that even youth who are bonded to antisocial others can be positively influenced to avoid gang membership by efforts to enhance their beliefs in prosocial values – a youth can have antisocial bonds and not actively join the gang if their prosocial beliefs are fostered. Further exploration of this relationship is warranted, particularly given what we know about the effects of antisocial peers (Esbensen, Peterson, Taylor, & Freng, 2009; Gilman, Hill, Hawkins, Howell et al., 2014; Huizinga et al., 2003; Lahey, et al., 1999) and long-term embeddedness within antisocial networks on sustaining gang membership over time (Pyrooz, Sweeten, & Piquero, 2013).

Study Limitations

The current study had constraints worth noting. First, data used for these analyses come from a community sample located in Seattle, WA, with participants who were in their adolescent years in the 1980s and 1990s. Consequently, subsequent model tests in samples from other geographic areas or time periods is needed. Second, while self-reported gang membership is commonly used (Boxer et al., 2015; Bjerregaard & Smith, 1993; Dishion et al., 2005; Esbensen et al., 2001; Fox et al., 2010; Klein, 1995; Tapia, 2011; Thornberry, Krohn et al., 2003) and empirically supported as a valid measure (Esbensen et al., 2010), there are risks with self-reported data including the possibility of over- or under-reporting. Finally, because gang membership in the sample was measured, in part, during the same time period (7th through 10th grades, when the respondents were 12 – 15 years old) as the items that comprised the SDM constructs, questions regarding temporal ordering cannot be definitively resolved. This has been a commonly discussed issue in the field of gang research, particularly related to the use of cross-sectional data to determine risk factors for

gang onset (e.g., Howell, 2012). If risk factors and outcomes are measured at the same time, causal ordering cannot be determined with certainty, which raises the question of whether predictive factors for gang membership might also be outcomes of the membership itself. However, sensitivity analyses exploring the issue of temporality in the current analyses suggested little to no differences in model fit and path estimates as a result of excluding youth who joined a gang during the SDM construct measurement period. Furthermore, prior SDM tests where model constructs (predictor variables) explicitly temporally preceded outcomes related to gang membership (e.g., violence, alcohol use, substance use) yielded results highly consistent with the present study (see for example, Catalano et al., 1996; Huang et al., 2001; Kosterman et al., 2014; and Longzak et al., 2001). Additional tests of the SDM's prediction of gang membership with clear temporal ordering are warranted to support the present findings.

Conclusions

The current study is the first to test the capacity of the social development model (SDM) to predict the developmental pathways that increase and decrease the likelihood of gang membership using relevant social development constructs. Understanding the pathways that reduce risks and enhance protective influences to mitigate gang involvement has the potential to inform the development of targeted preventive intervention strategies. Results suggest that the SDM provides a good accounting of the developmental pathways that contribute to gang membership, particularly when including additional child-driven paths from social skills to opportunities. While each of the constructs in the SDM is a potential focus for preventive intervention to reduce the likelihood of gang membership, results from these analyses suggest three key intervention points worth considering. First, enhancing skills for interaction with others has the potential to increase prosocial socialization and reduce antisocial socialization processes. Second, increasing the availability of prosocial opportunities, while reducing antisocial opportunities, and rewarding engagement in these opportunities will influence positive beliefs and values which in turn reduce the likelihood of gang membership. Finally, efforts to reduce antisocial socialization experiences throughout the middle- and high school years are promising targets for gang preventive intervention efforts.

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Biographies

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Karl G. Hill, Ph.D., is a Social Developmental Psychologist by training, has worked at the University of Washington's Social Development Research Group since 1994. His work has focused on understanding development and consequences of antisocial behaviors such as drug use and dependence, crime, and gang membership, and the mechanisms of continuity and discontinuity in these behaviors across generations. Once identified, these mechanisms can then be targeted through preventive intervention to improve health and break intergenerational cycles of problem behavior. Most recently, Dr. Hill has lead a NIDA-funded study to examine gene-environment interplay in the development of alcohol and tobacco addiction and related problems.

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Richard F. Catalano, Ph.D., is the Bartley Dobb Professor for the Study and Prevention of Violence, the co-founder of the Social Development Research Group in the School of Social Work, University of Washington, and President of the Society for Prevention Research. For over 35 years, he has led research and program development to promote positive youth development and prevent problem behavior. His work has focused on discovering risk and protective factors for positive and problem behavior, designing and evaluating programs to

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J. David Hawkins, Ph.D., is the Endowed Professor of Prevention and Founding Director of the Social Development Research Group, University of Washington School of Social Work. His research focuses on understanding and preventing child and adolescent health and behavior problems. Dr. Hawkins is a current member of both the National Academies' Board on Children, Youth, and Families and the Forum on Promoting Children's Cognitive, Affective, and Behavioral Health. He is also a steering committee member of the Coalition for Promotion of Behavioral Health. He received his PhD in sociology from Northwestern University.

Figure 1.
The Social Development Model of Antisocial Behavior: A General Model

Figure 2.
Structural Path Estimates for the Final First-Order Factor Model

Figure 3.
Structural Path Estimates for the Final Second-Order Factor Model

Table 1

Measurement of SDM constructs.

Construct	N of items	Data sources	Example items
Prior violent behavior (age 13)	7	youth, parent, teacher	Physically attacks people
Opportunities for prosocial involvement	11	youth, parent	My parents give me lots of chances to do things with them
Opportunities for antisocial involvement	18	youth	Have you ever been invited to join a gang?
Involvement in prosocial activities	17	youth, parent	In how many school clubs or activities outside class did you participate this year?
Involvement with those involved in problem behaviors	11	youth, parent, teacher	Hangs around with others who get in trouble
Skills for interaction	9	youth	If one of your friends asked you to skip school, what would you do? [scaled towards peer resistance]
Rewards for prosocial involvement	24	youth	My parents notice when I am doing a good job and let me know about it
Rewards for antisocial involvement	12	youth	What are the chances you would be seen as cool if you beat up somebody?
Bonding to prosocial others and activities (attachment and commitment)	19	youth, parent	Would you like to be the kind of person your mother is? [if mother is not antisocial]
Bonding to antisocial others	9	youth	Do you want to be the kind of person your best friend is? [if friend is antisocial]
Belief in the prosocial values [developed as a single construct scaled towards prosocial beliefs]	12	youth	Is it okay to take something without asking if you can get away with it?

Table 2

Factor intercorrelations for the first- and second-order factor models

Factor	1	2	3	4	5	6	7	8	9	10	11	12	13
First-order constructs													
1. Prior violent behavior (age 13)													
2. Skills for interaction	-.30***												
3. Prosocial opportunities	.01	.40***											
4. Antisocial opportunities	.47***	-.57***	-.25***										
5. Prosocial involvement	-.14*	.52***	.65***	-.35***									
6. Antisocial involvement	.54***	-.64***	-.12*	.77***	-.40***								
7. Prosocial rewards	-.12*	.54***	.73***	-.51***	.72***	-.48***							
8. Antisocial rewards	.27***	-.71***	-.42***	.59***	-.47***	.55***	-.59***						
9. Prosocial bonding	-.24***	.37***	.32***	-.44***	.36***	-.37***	.44***	-.33***					
10. Antisocial bonding	.12**	-.29***	-.04	.37***	-.15**	.39***	-.26***	.26***	-.57***				
11. Belief in prosocial values	-.23***	.48***	.29***	-.33***	.29***	-.32***	.39***	-.46***	.58***	-.39***			
Second-order constructs													
12. Prosocial socialization	-.02*	.09***	-	-	-	-	-	-	.09***	.01***	.08***		
13. Antisocial socialization	.13***	-.15***	-	-	-	-	-	-	-.11***	.16***	-.11***	-.08***	
14. Gang membership (1 = yes) ^a	7.00***	0.17***	0.74	2.57**	1.52	3.39***	0.38*	6.19***	0.60*	1.21	0.33***	0.81	14.31***

Notes:

^aPresented as odds ratios from bivariate logistic regressions examining the relationships between gang membership and the latent factors. Blanks (-) are listed for first-order factors that serve as indicators of the second-order factors.* significant at $p < .05$,** $p < .01$,*** $p < .001$

Table 3

Standardized factor loadings for the first- and second-order factor structures

Construct	Indicator variable	First-order factor model	Second-order factor model
Prior violent behavior	V1	.68***	.69***
	V2	.56***	.57***
	V3	.68 _r	.68 _r
Skills for interaction	V4	.66 _r	.71 _r
	V5	.57***	.63***
	V6	.57***	.59***
Prosocial opportunities	V7	.73 _r	.73 _r
	V8	.63***	.65***
	V9	.43***	.44***
Antisocial opportunities	V10	.78***	.79***
	V11	.75***	.75***
	V12	.76 _r	.76 _r
Prosocial involvement	V13	.74 _r	.84 _r
	V14	.50***	.46***
	V15	.53***	.53***
Antisocial involvement	V16	.74***	.73***
	V17	.45***	.45***
	V18	.71 _r	.73 _r
Prosocial rewards	V19	.85 _r	.85 _r
	V20	.86***	.87***
	V21	.73***	.73***
Antisocial rewards	V22	.65 _r	.66 _r
	V23	.65***	.67***
	V24	.80***	.80***
Prosocial bonding	V25	.86***	.86***
	V26	.87 _r	.87 _r
	V27	.83***	.83***
Antisocial bonding	V28	.93 _r	.93 _r
	V29	.98***	.98***
	V30	.98***	.98***
Belief in prosocial values	V31	.84***	.84***
	V32	.78***	.78***
	V33	.89 _r	.89 _r

Notes: *r* = reference indicator with unstandardized loadings fixed at 1.00 to identify the metric of the latent variable. All factor loadings are standardized estimates.

significant at $p < .001$

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Table 4

Standardized betas, standard errors, and p-values for the final second-order structural paths

Structural paths	beta	s.e.	p-value
<i>Prior Violent Behavior</i>			
Gender (1 = male)	.12	.04	.006
African American (1 = yes)	.16	.06	.007
Asian American (1 = yes)	-.15	.04	.001
Native American (1 = yes)	.01	.04	.857
Socioeconomic status	-.18	.05	.001
<i>Skills for Interaction</i>			
Prior violent behavior	-.30	.07	.001
Gender (1 = male)	-.17	.04	.001
African American (1 = yes)	.11	.05	.024
Asian American (1 = yes)	.13	.05	.006
Native American (1 = yes)	-.09	.05	.063
Socioeconomic status	.03	.05	.568
<i>Prosocial Socialization</i>			
Prior violent behavior	.05	.06	.407
Skills for interaction	.63	.05	.001
Gender (1 = male)	.08	.04	.052
African American (1 = yes)	.02	.05	.735
Asian American (1 = yes)	.01	.04	.807
Native American (1 = yes)	.04	.03	.230
Socioeconomic status	.09	.04	.024
<i>Antisocial Socialization</i>			
Prior violent behavior	.27	.06	.001
Skills for interaction	-.67	.05	.001
<i>Prosocial Bonding</i>			
Prosocial socialization	.47	.04	.001
<i>Antisocial Bonding</i>			
Antisocial socialization	.32	.04	.001
<i>Belief in Prosocial Values</i>			
Prosocial bonding	.54	.04	.001
Antisocial bonding	-.08	.04	.062
<i>Ever Joined a Gang (1 = yes)^d</i>			
Antisocial socialization	.29 (5.64)	.08	.001
Antisocial bonding	.08 (1.24)	.05	.137
Belief in prosocial values	-.13 (0.60)	.06	.019
Prior violent behavior	.14 (1.80)	.07	.052
Gender (1 = male)	.33 (5.01)	.04	.001
African American (1 = yes)	.15 (2.33)	.05	.002
Asian American (1 = yes)	.15 (2.44)	.05	.006

Structural paths	beta	s.e.	p-value
Native American (1 = yes)	.12 (3.72)	.05	.010
Socioeconomic status	-.15 (0.64)	.05	.002

Note:

^aEstimates are presented as point biserial correlations with odds ratios in parentheses.