Measuring Social Determinants of Health Worldwide: Testing a Multidimensional Model for Predicting Health Risk Behaviors

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Vigil's (1983; 1988; 2002) Multiple Marginality (MM) model of gang formation has resulted in hypotheses about why minority youth join gangs, and how these processes play out at multiple levels of analysis and across contexts. However, with a few exceptions, this framework has rarely been tested quantitatively, and especially in countries outside of North America. The current study assesses the MM model using data from the Second International Self-Report Delinquency Study and aggregate country-level data. Results from multilevel analyses reveal some support for the framework, in that at least one measure of each component of the MM model was found to be a significant predictor of gang membership. Controlling for individual and country variables, measures of street socialization exhibited the strongest effects on gang involvement. Yet not all proposed factors were significant predictors across all models. Longitudinal data are necessary to fully support the dynamics of the MM model.

Keywords: multiple marginality; gangs; multilevel models; ISRD-2

Introduction

Because of the violence that often accompanies street gangs, it is important to understand the fundamental processes that lead youth to join gangs in the first place (Klein, 2007). Fortunately, in their recent article taking stock of gang scholarship, Decker, Melde, and Pyrooz (2013) note that "The last two decades have seen exponential growth in the study of gangs, gang members, and the group processes that make gangs a distinctive group" (p. 369). And while the literature has made advances in our understanding of gang-joining (e.g. Densley, 2015; Pyrooz & Densley, 2016), there remain unanswered questions regarding the factors that lead youth to become gang-involved. Better understanding of how these factors and processes vary based on race or ethnicity is also needed, particularly because gang-involved youth in the United States tend to belong to ethnic or racial minority groups (Howell & Griffiths, 2019).

Theoretical development over the past several decades by Vigil (1983; 1988; 2002) has not only produced hypotheses about processes that lead some minority youth to join gangs, but also how these processes might play out at multiple levels, which has contributed to a complex model that includes macro-level social forces, meso-level neighborhood, school, and family contextual factors, and individual-level psychological constructs. But despite the qualitative research undertaken by Vigil (2002) and others (e.g. Page & Marcelin, 2003; Lee, 2016; Van Ngo, Calhoun, Worthington, Pyrch, & Este, 2017) in explaining gang formation and in particular minority gang involvement at multiple levels of analysis, these studies are often limited in their scope by taking place in a single geographic location with members of only one or two minority groups (Krohn, Schmidt, Lizotte, & Baldwin, 2011). Moreover, empirical assessments of these multi-level and cross-cultural explanatory models of gang formation are needed, yet often difficult to test quantitatively due to data or methodology limitations (Freng & Esbensen, 2007). The current study adds value to the growing stock of gang literature

by quantitatively assessing one such multi-level model of gang involvement, specifically Vigil's (2002) Multiple Marginality (MM) model of gang formation.

At its inception, the MM model intended to explain why Latino youth living in Los Angeles formed or joined gangs. Vigil's model (1988; 2002) proposed that macro-historical and -structural processes created marginalized groups with disadvantaged ecological/sociological conditions, which weakened social controls and allowed youth to be "street socialized" and form a "street identity." The author eventually proposed to apply this model to any ethno-racial minority group. Despite multiple qualitative applications of this model to date, there have been relatively few quantitative tests of these concepts. This study aims to extend this literature base by operationalizing Vigil's (1988) MM concepts and incorporating key macro-structural components into our analyses that have typically been excluded in previous tests. In addition to offering a more complete test of Vigil's theoretical model, this study also answers Klein's (2007) call for more comparative gang research. Van Gemert and Weerman (2015) found that gang delinquency in Europe is "linked to the marginalized position of migrants youths" (p. 514), suggesting that the MM model could be applicable outside the US. By leveraging an international delinquency survey, this study ultimately examines whether the processes initially intended to describe Latino youth gang involvement in the United States extend to a more diverse population of youth across different country contexts. In the following sections, we describe Vigil's MM framework in more detail, as well as the studies that have used this framework to date. We will then describe the current study, including the data, methods, and analyses used to answer our main research questions. We discuss our findings in light of Vigil's model and prior research. In the final sections, we describe some of the limitations of this work and offer some concluding remarks as well as aims for future research.

Literature Review

Multiple Marginality Framework

Vigil's (1988; 2002) MM framework describes a sequence of processes that lead to gang formation among ethnic and racial minorities. He describes this framework as a holistic depiction of how gangs form amid multiple social, economic, and cultural barriers (Vigil, 1988; 2002). These barriers operate at multiple levels, ranging from macro-structural and historical factors to meso-level processes of socioeconomic marginalization to socio-psychological processes of identity formation. His model further incorporates aspects of existing criminological theory, especially elements of systemic theory (Bursik & Grasmick, 1993; Shaw & McKay, 1942), subculture of violence (Wolfgang & Ferracuti, 1967), as well as social control (Hirschi, 1969). While Vigil originally developed his model in the late 1980s with regard to Latino youth in Los Angeles, he has since sought to expand its application to other groups as well (Vigil, 2002).

A visual depiction of the model is included in Figure 1 below (Vigil, 2010). Briefly, Vigil (1988) argues that youth who are marginalized culturally and socioeconomically, who do not experience prosocial controls from their families, schools, or formal authorities, and who turn to and eventually become socialized in the streets, are more likely to join gangs as part of a street identity (Vigil, 1988). In the sections below, the main processes associated with MM that are relevant to the current study will be discussed in turn.

[Insert Figure 1 about here]

The MM framework begins with the supposition that broad social processes such as immigration and migration lead to the spatial concentration of groups who are often of racial or ethnic minority status (Vigil, 1988, 2002). Vigil (1988, 2002) lays out specific macro-level forces in the upper left quadrant of his model, including historical elements such as racism and fragmented institutions, as well as structural processes such as immigration and enclave settlement. As most of his ethnographic work detailed the experiences of Latino youth in Los Angeles, he used this case to describe how immigration from Mexico and other Latin American countries led to patterns of social and economic marginalization among youth. According to Vigil (1988; 2002), these macro-level forces are precipitants to the ecological and socioeconomic situation in which many minority populations find themselves. Put simply, newly-arrived immigrants or migrants tend to move to and concentrate in the interstitial areas of a city, referring to the spatially and visually segregated areas far from the city center (Shaw & McKay, 1942). These areas tend to be socially disorganized, characterized by low residential stability, high population density, concentrated poverty, a dearth of job availability, and disrupted households (Shaw & McKay, 1942). Youth who grow up in these areas marked by high poverty and little job relief, along with a lack of personal space in their own home, may come to feel frustrated at their "underclass" status (Vigil, 1988, 2003) and turn to, and begin to be socialized by, the streets.

Vigil also describes how experiences such as discrimination in school and by authorities, or those that generally are in conflict with one's cultural identity, can lead to further marginalization of youth. He implicitly notes the role of acculturation in gang formation (Vigil, 1983), and postulates that Latino youth undergo a process of Choloization[1] when they are unable to identify with either Mexican or Anglo culture (Vigil, 1983; 1988). Choloization can facilitate street socialization and can help Cholos find a sense of identity by affiliating with the gang subculture. In some of his earlier work, he examined acculturation among Mexican American adolescents, and how they adapted to their environments (Vigil, 1979). He conducted in-depth case studies with a total of 12 students from one urban and one suburban high school. In each school, he selected the two most nativist (Mexican-oriented), the two most intermediate (Chicano-oriented), and the two most acculturated (Anglo-oriented) students, and found that the suburban Chicano- and Anglo-oriented students participated in gang-related activities, despite being more acculturated.

Lacking effective controls from the family unit, the schools, or law enforcement, marginalized youth spend more time on the streets, and eventually internalize and adopt a street mentality. The street socialization process, and internalization of the street mentality, is what Vigil (2003) posits ultimately accompanies gang involvement. His initial concern in explaining Latino gang formation eventually gave way to his argument that the same mechanisms apply to other groups of racial or ethnic minority status. That is indeed the theme of his text, *A Rainbow of Gangs* (Vigil, 2002), where he describes the context and history of Vietnamese, Salvadoran, Mexican, and African American immigration and migration into Los Angeles, and how it sets the stage for the gang experience. Through these case studies, Vigil found that many of the same processes and outcomes of marginalization identified through his early fieldwork in the barrios applied just as well to the Vietnamese, Salvadoran, and African American youth he examined in this work. Despite his cross-cultural sample however, his model for gang joining was developed in a single place (i.e. Los Angeles), which begs the question of whether this model does in fact transcend any particular minority group outside of this city. Vigil (2010) claims it does in *Gang Redux: A Balanced Anti-gang Strategy*, noting that the "gang subcultural process unfolds in like manner from place to

place—not only in the United States but in other nations as well" (Vigil, 2010, p. 2). However, as discussed more fully below, most empirical assessments of this framework to date have been limited to North America and the dominant ethno-racial minorities therein.

Previous Tests of the Framework

Several qualitative studies by other researchers have utilized Vigil's framework across the United States and in Canada, and have applied it to groups outside of Mexican Americans. Such studies include examinations of gang formation amongst Haitian youth in Miami (Page & Marcelin, 2003), Asian gang onset and persistence (Lee, 2016), former gang members' reasons for joining gangs and their lived experience in Tulsa, OK (Cephus-Wilson, 2012), gang-joining reasons from immigrant youth in Calgary (Van Ngo, Calhoun, Worthington, Pyrch, & Este, 2017), and the further marginalization effects of gang injunctions (Caldwell, 2010). Each of these studies found support for, or utility in using, the MM framework.

In recent years, researchers have also adapted the MM model for quantitative testing, incorporating variables that correspond to the main constructs in Vigil's model (Ventura Miller, Barnes, & Hartley, 2011; Freng & Esbensen, 2007; Krohn, Schmidt, Lizotte, & Baldwin, 2011). Freng and Esbensen (2007) conducted the first quantitative test of the MM framework. They examined whether the MM model, as conceptualized, provided a viable explanation for gang membership and whether it applied globally or uniquely to different racial/ethnic groups, using multi-site survey data from a national evaluation of the G.R.E.A.T. gang prevention program. Their conceptualization of the MM framework included ecological/economic stressors, social control and street socialization elements.[2] Their results showed general support for MM in predicting current gang membership, as a majority of the concepts were found to be important predictors. Whether the framework functioned similarly for different ethnic and racial groups depended on if looking at current gang membership (differences in predictors for White and minority youth) or if youth were ever in a gang (more similarity across groups).

In the conclusion of their paper, Freng and Esbensen (2007) discussed the cross-sectional nature of the data as a limitation. Krohn and colleagues (2011) answered the call for longitudinal research with their study of youth participating in the Rochester Youth Development Study. They examined the relationship between economic marginalization, parental and school ties, self-esteem, and risky time with friends on respondents' ever being in a gang. They found that the framework did not apply consistently across all races, and some predictors (family-process and school-related measures) did not affect gang membership for any race. However, while this study improved upon the cross-sectional design of the previous research, it was limited by ethnic group sample size.

Drake and Melde (2014) examined the ability of Vigil's framework to predict gang membership using cross-sectional and prospective models. Using longitudinal G.R.E.A.T. data and the same operationalizations of MM model constructs as Freng and Esbensen (2007), they found the results from these types of models differed. Their cross-sectional results were similar to Freng and Esbensen (2007), however their lagged model revealed educational opportunity as the sole MM-related predictor, leading them to conclude that gang membership predicts the MM factors, not the other way around.

Despite the progress these studies have made in applying the MM framework to a broader audience, it still remains to be seen how far this framework can travel. Vigil's

original focus was on Mexican immigrants in America, and he expanded his analysis to include other marginalized immigrant populations. Other scholars, such as Decker, Van Gemert, and Pyrooz (2009), have examined the role of immigration on gang formation, and their findings suggest that the marginalization that immigrants face when coming to a new country could impact gang formation and membership outside of the US as well. Our research hopes to understand whether the MM framework, therefore, could be applied around the world, as similar structural conditions and marginalization could exist globally.

Current Research

This study builds on prior work that has examined Vigil's theoretical propositions through quantitative methodologies. We examine measures corresponding to the MM model constructs that prior researchers have investigated, including economic marginalization, social marginalization, neighborhood/social environment, ties to family, ties to school, street socialization, and attitudes towards violence, though we were unable to include measures of ties to law enforcement due to data limitations. Departing from previous tests, we also include some country-level measures to tap into the macro-structural forces described in the MM model. This study leverages an international delinquency survey to help test Vigil's propositions in part, focusing our regression analyses on the European continent. We limit our test to European countries, as we were necessarily guided by data availability at multiple levels of analysis (i.e. individual-level and country-level). Additionally, this study responds to the relative lack of macro-structural variables included in previous tests of this framework. This research answers two main questions:

(1) Do MM constructs predict gang membership across Europe?
(2) Does inclusion of certain country-level variables help MM's predictive power?

Methods

To answer the research questions, data must be used at both the individual level and the country level. Therefore, the analytic framework used in this research is hierarchical linear modelling (HLM). HLM is useful when studying individuals in context, because it adjusts for the non-independence of observations from the same context, thus providing a more rigorous statistical assessment of these relationships than standard models (Raudenbush & Bryk, 2002; Luke, 2004; Baumer & Arnio, 2012). This research leverages available data from the Second International Self-Reported Delinquency Study (ISRD-2); the World Bank; the United Nations; and the European Social Survey.

Responses to the ISRD-2 are used in this research to provide data at the individual level (Enzmann et al., 2015). The ISRD-2 is a cross-sectional, transnational survey of delinquency and victimization among mostly 12 to 15-year-old students in 30 countries from 2005-2007.[3] The sample of countries is mostly a convenience sample comprising European nations, but also includes a small number in North America and South America. The sampling design for the ISRD-2 was school-based, and randomly drawn at the city- or national-level, with classrooms as the primary sampling unit (Marshall & Enzmann, 2012). While there were many complexities in sampling schools and reaching students across multiple countries, the total ISRD-2 sample response rate was around 65-70%, which is within the normal range (Marshall & Enzmann, 2012). Surveys were administered primarily by paper and pencil, but computers were used for data collection in some countries (Aebi, 2009). The target was around 2,100 responses for each country, with a third conducted in a large city, a third in a medium-sized city,

and a third in a few small towns (Enzmann et al., 2010). One limitation of the study is that some countries have a sample that is only city-based, and is therefore not nationally representative (Enzmann et al., 2010); however, when looking at explanations of offending behavior, the representativeness of the sample is not as important (Marshall & Enzmann, 2012).

The ISRD-2 was an expansion upon the ISRD-1, which was initiated in 1988 and implemented in 13 countries, with a goal of examining different patterns of delinquency and testing the generalizability of multiple theories (Enzmann et al., 2010). The main component of the ISRD-2 is the student questionnaire, which incorporates items and scales about a range of factors thought to be theoretically relevant to juvenile delinquency and victimization; these include questions about socioeconomic status, immigrant status and ethnic minority group, family, school, neighborhood, lifestyle/leisure time, life events, attitudes towards violence, and self-control, in addition to delinquency, victimization, and risky behavior themselves (Marshall & Enzmann, 2012).

We also incorporate theoretically-relevant macro-level constructs in our models using data from the World Bank, the United Nations (UN), and the 2006 European Social Survey. World Bank estimates are obtained through household survey data for each country, and through World Bank country departments (World Bank, n.d.). UN migration data are primarily sourced through national population censuses (United Nations, 2017). The European Social Survey is conducted with a cross-national sample of European countries every 2 years, and is intended to measure respondents' attitudes, beliefs, and behaviors over time.[4] The current study uses 2005 estimates from these sources as much as possible, though the 2006 round of the European Social Survey is used.

Dependent Variable

The dependent variable in this study is gang membership. The construction of this variable is based off of the Eurogang definition: "any durable street-oriented youth group whose involvement in illegal activity is part of their group identity'' (Weerman et al., 2009, p. 20). This binary outcome is based on responses to the following questions in the ISRD-2:

- Do you have a group of friends?
- How long has this group existed? (>3 months)
- Which of the following best describes the age of people in your group? (12-25)[5]
- Does this group spend a lot of time together in public places?
- Is doing illegal things accepted by your group?
- Do people in your group actually do illegal things together?

Respondents had to reply "yes", or responses had to fall within the correct category, to each of these questions to be considered a gang member; just responding in the affirmative to some or a majority of the questions was not sufficient. The survey also included the question "Do you consider your group of friends to be a gang?", but there is denial of a gang problem in many parts of the world because their "groups" do not fit the idea of a "gang" in the traditional American sense of the word (Klein, 2007), and therefore we do not include this self-report measure. The percentage of gang members in each country for the total sample, as identified by this definition, is presented in Figure 2.[6]

[Insert Figure 2 about here]

Independent Variables

To test as full of a conceptualization of the MM framework as possible, independent variables are included at the individual and country levels. Data for the descriptive statistics come from all 30 countries, but regression analyses are conducted on a more limited European subsample of 19 countries due to missing country-level data. *Country-level Variables.* Immigration and migration are important constructs in the MM framework. They represent major processes that situate ethno-racial minority youth in contexts where they can become marginalized. We aim to capture this important part of the MM model in our study by including a measure for country-level migration. We specifically use a measure from the UN Migration Data that measures the percent of each country's population who were migrants in 2005 (United Nations, 2017). Migrants, in this case, refers to individuals who were born in a different country from the one where they currently reside, and also includes refugees.

Aggregate measures of discrimination and attitudes towards immigration are constructed from estimates in the 2006 European Social Survey.[7] These measures are used to account for potential country-level discrimination and immigration attitudes separate from individual-level measures of marginalization in the ISRD-2. Aggregate discrimination is constructed as a dichotomous (0/1) variable that indicates 1 if individual respondents reported being the member of a discriminated group in their country. A discriminated group could be based on race, nationality, ethnicity, language, or religion. The mean of this variable is used to represent the country-level proportion of respondents who reported being a member of a discriminated group, and then log-transformed to adjust for skewness across countries. Aggregate attitudes towards immigration were also obtained through the 2006 European Social Survey. Respondents were asked a series of 6 questions relating to their attitudes towards immigration and immigrants in their country. They include such statements as "Immigration is bad or good for the economy", where respondents could answer anywhere on a range from 0 (bad for the economy) to 10 (good for the economy). The 6 immigration items were combined to create an additive scale that ranged from negative attitudes towards immigration to positive attitudes towards immigration. The alpha coefficient for the 6 items is $\alpha>0.82$. Respondents' scores were then aggregated to create a mean score for each country.

Other macro-level constructs such as economic inequality and poverty are also included in the model to control for potential variation in the socioeconomic characteristics across countries. Economic inequality is measured as the Gini index estimate from the World Bank (World Bank, n.d.). The Gini index estimate measures the degree to which a country's actual income distribution differs from a perfectly equal income distribution (World Bank, n.d.). The values of the Gini index estimate range from 0 (or perfectly equal), to 100 (or completely unequal distribution). Poverty is measured as the percentage of the country's population who were living on less than $5.50 a day (World Bank, n.d.).

Finally, we include aggregate measures of fear of crime and victimization in each country to control for the variation in crime incidence that likely exists across country contexts. We use measures from the 2006 European Social Survey to capture reported victimization as well as an index indicating how worried the respondents are about being victimized. For both measures, victimization refers to being victimized by burglary or violent assault. The victimization measure is a dichotomous (0/1) variable,

where 1 indicates the respondent or a member of the respondent's household was a victim of a burglary or assault in the previous 5 years. The mean of this variable was calculated by country to reflect a country-level proportion of respondents who reported being victimized. The index of how often respondents worry about being victimized is an additive index of two items asking respondents to indicate how often they worry about being victimized by violent crime or burglary. The index ranges from "not at all" to "all the time", and has an alpha coefficient of $\alpha>0.70$. The mean scores by country for each of the country-level indicators are included in Table 1.

[Insert Table 1 about here]

Individual-level Variables. The individual-level independent variables include items related to youth survey responses surrounding economic marginalization (3 items), social marginalization (3 items), neighborhood environment (index of 13 items), ties to parents (3 items), ties to school (8 items), street socialization (4 items), and attitudes towards violence (3 items) (as a proxy for components of the street subculture and one's street identity). None of these measures have previously been used and validated in the exact composition that occurs in this study, with the exception of the index of neighborhood quality, which was part of a scale developed by Sampson and colleagues (1997; 1999) (Marshall & Enzmann, 2012, p. 55). The other items have been included in other studies and empirically tested in some format, but were selected for our study not as an entire index of a theoretical construct, but as individual items that matched previous operationalizations of Vigil's model, as well as those that conceptually made sense to include based on qualitative work. Our ability to fully explore the MM framework is limited by the items included in the ISRD-2, which, while including questions related to a variety of theoretical frameworks, was not created with the testing of this one in mind. Appendix B provides the conceptualization and operationalization of the individual-level MM constructs, in addition to operationalization in previous research, and justifications for inclusion in the current study. The descriptive frequencies for each variable (and mean, standard error for neighborhood index), for the total survey sample and the limited European subsample, can be found in Table 2. While the regression analyses are only conducted on this European subsample, the descriptive frequencies are shown for the total sample available from the ISRD-2 to provide context for the regression results and illustrate how these might differ from analyses that could provide a more complete global analysis in the future.

[Insert Table 2 about here]

Correlations were conducted with both the set of individual-level and country-level variables (not shown)[8]. For relations among individual predictors, aside from dummy variables representing categorical variables with more than two groups, none of the bivariate relations exceeded moderate correlation ($-0.5 > r > 0.5$). For country-level predictors, only the variable measuring worry about victimization was moderately correlated with crime victimization (r=.57), and the country-level discrimination variable (r= .51).

Data Analysis

Following the example of Freng and Esbensen (2007), our main analyses are stepwise mixed-effects logistic regression models of responses from 19 European countries, with each additional model incorporating variables from the next theoretical level of the framework.[9] Because the ISRD-2 data include individuals nested within countries and the potential for significant between-country differences, this study first tests to see

whether a multi-level model is appropriate. In order to test this, a null model is run to see whether the between-country differences are significant. We use the Stata 15 command *melogit*[10], analyzing individuals (Level-1) nested within countries (Level-2). Including the ANOVA model to test whether a multi-level model is needed and the full model without the country-level variables to answer our second research question, nine sequential models are analyzed in the following section.

Results

Our first model was a test to determine whether there are significant differences in gang membership by country to justify a nested model. The likelihood ratio test, for a null hypothesis that between-country variance is zero, found that this null hypothesis could be rejected (χ^2=824.66, p<0.001), indicating that a multi-level model was appropriate for these analyses. Furthermore, the between-country intraclass correlation coefficient (ICC) was 0.06, indicating that a small, albeit significant, 6% of variation in gang membership was explained by country-level differences. Subsequent models incorporate control demographic variables and blocks corresponding to the MM framework. The details of the following eight models, incorporating controls and the MM covariates, can be found in Table 3.[11]

[Insert Table 3 about here]

As might be expected, being male and an older teenager (16-18 years old) were associated with higher odds of being gang involved than being female and 12-15-years-old, respectively. These effects remained significant until measures of street socialization and attitudes towards violence (as a proxy for street identity) were introduced into the model, at which point, neither one's gender nor age independently predicted gang membership.

Country-level variables tapped into multiple constructs; however, there was only one predictor, attitudes toward immigration, that was significantly related to gang membership. In general, when respondents lived in a country where the attitudes towards immigration were more positive, they were more likely to be gang involved than not (odds ratios ranging from 1.09 (p<0.05) to 1.12 (p<0.01)).

Whether youth reported living with both parents versus some other living situation (OR 0.89, p<0.05), and whether they reported having their own room versus sharing a room (OR 1.16, p<0.01), were the only economic marginalization variables that were significantly related to gang involvement, though this latter effect washed out once the predictors measuring street socialization and attitudes towards violence were entered into the model. All predictors associated with individual-level social marginalization were significantly related to gang membership, though only the variable measuring household language spoken remained significant in all models. When considering country context in addition to all other MM predictors included in this study, youth who reported speaking the native language of their current country at home were 30% more likely than youth who reported speaking another language at home in being gang involved (OR 1.31, p<0.001). This variable was also the only social marginalization variable that went in the opposite direction than was predicted. For instance, respondents reporting never having been discriminated against were less likely than their counterparts to be gang involved (OR 0.86, p<0.01), and non-native youth whose friends were mostly native were also less likely than non-native youth with mostly non-native friends at being gang involved, though these effects disappeared with the introduction of the attitudes towards violence measures.

The impact of neighborhood context on gang involvement was significant and negative for all models, though this effect decreased as more of the theoretical variables were entered into the model (Full model OR 0.79, p<0.001). Ties to parents, particularly whether parents always knew a respondent's friends when they went out were strong predictors of gang involvement (Full model OR 0.65, p<0.001). There were multiple school-related variables that were significant predictors of gang membership. Those strongest predictors were never being truant (OR 0.44, p<0.001), the amount of time spent on homework being an hour or more (OR 0.62, p<0.001), and teachers noticing when respondents do well and saying so (OR 0.89, p<0.01). The latter variable increased in predictive strength once street socialization was included in the model (Full model OR 0.83, p<0.001). All street socialization variables were significant in the final models, controlling for all other predictors. Particularly strong predictors include if the respondent's friend group did not use substances or ever shoplift items versus engaging in this behavior at least sometimes. Similarly, the attitudes towards violence variables were all significant predictors of gang membership, with the measure indicating the respondent would fight back if attacked being the largest in magnitude.

To assess for potential issues related to multicollinearity, Variance Inflation Factors (VIFs) were calculated after running the fully specified model. All VIFs were less than 3, with the exception of two dummy variables representing two categories of the parental work status variable, for which the VIFs were 5.7 and 5.9, suggesting multicollinearity is not a major issue in these models.

Model Fit

The level-2 variance of Model 1 was 0.2251, and this drops to 0.0877 by Model 8, a reduction of 61%. The BIC values of Models 1 through 8 suggest better fit with the inclusion of each set of variables, with the initial BIC in Model 1 being 28,748.21 and the BIC in Model 8 being 17,014.55, a drop of over 10,000. Model 9 shows the trade-offs of including the country-level variables. While the BIC of Model 9 dropped to 16,952.41 when the country-level variables were excluded, indicating a better model fit, the level-2 variance increased to 0.166. So while the model might be slightly better specified without them, a model including the country-level predictors can account for almost 50% more of the level-2 variation than one that includes only individual-level predictors.

Discussion

The current research found partial support for the influence of country context on individual-level gang membership, and yielded some seemingly counterintuitive results. For instance, the economic context of countries did not matter much in predicting individual gang membership, at least in the current models. While we would intuit that countries with higher income inequality would facilitate some of the strain that marginalized youth feel, it might be that state-level context does not matter so much for individual-level strains compared to economic strains more locally felt (i.e. city or community-level). Additionally, there may be a moderation effect between economic disadvantage at the structural level and ethno-racial heterogeneity. For instance, Pyrooz, Fox, and Decker (2010) found that, at the state level, when racial heterogeneity is high, economic disadvantage matters more for gang formation than when heterogeneity is low.

In addition, the direction of the relationship between country-level attitudes towards immigration and individual-level gang membership was surprising. Vigil

(1988) does not discuss attitudes towards immigration in his model specifically, but he references the influence of historical racism and discrimination on social marginalization. Following this thread, we expected that youth living in countries where attitudes towards immigration were more negative than positive would be *more* likely to be gang-involved, yet we found the opposite to be true. One reason could potentially be due to the implicit need for sufficient time to experience marginalization. Countries that have a historic or older migrant population relative to newer migrant populations (e.g. such as that brought on by refugees) may hold more positive attitudes towards immigration. If so, we should expect that migrant populations that have been in residence for longer would be more entrenched in the society and thus have more time to experience the economic and social marginalization processes that Vigil (1988) discusses. Alternatively, measures of the migrant population's race or skin color might explain the positive effect of immigration attitudes on gang membership:for instance, if positive attitudes towards immigrants is specific to those migrating from certain regions, such as Western Europe versus Middle East/North Africa. The current study may be missing key predictors at the country level related to race, skin color, or ethno-racial heterogeneity that should be included in future iterations of this model.

Consistent with Freng and Esbensen's (2007) findings, some measures of economic marginalization, social marginalization, parental and school ties, street socialization, and attitudes towards violence/neutralizations were found to be significantly related to gang membership. Our finding about the positive impact of alternative language spoken at home was particularly interesting because it is consistent with what Vigil has suggested in regards to culture as a protective factor for gang membership (Vigil, 1979) and results from prior studies (Krohn et al., 2011), yet it contradicts findings from other scholars that the more acculturated a youth is (including more Anglo-oriented), the less likely they are to report gang involvement (Ventura Miller et al., 2011). Our finding hearkens back to Vigil's concepts of Choloization in the context of Mexican-American youth, where he found that individuals who were more Anglicized or more Chicano (i.e. somewhere "between" Mexican and American culture) were more likely to be gang involved than the nativist Mexican youth (Vigil, 1979).

The importance of neighborhood context in these models is consistent with what some scholars have found in regards to collective monitoring on gang members' delinquency and substance use (Quinn, Walsh, & Dickinson-Gomez, 2018). The findings from the current research shed light on the importance of community contextual factors, and may even point towards the relevance of other controls (Bursik & Grasmick, 1993) in predicting gang involvement, as opposed to just those exerted by family, school and law enforcement as specified in Vigil's model.

While mostly in line with Freng and Esbensen's (2007) findings, some of our social control findings contrasted those of previous tests of MM. We found that parental monitoring (in the form of parents knowing who their children are out with) was a significant predictor, which contradicts Krohn and colleagues (2011), who did not find any significance of parental monitoring in their longitudinal test of the MM framework. For ties to school, we found that variables related to school commitment and school attachment were significantly related to gang membership across all the models, while those more related to achievement dropped out once street socialization was taken into account. The significance of school commitment is in line with Freng and Esbensen's (2007) findings, but non-significance was found in other studies (Krohn et al., 2011; Drake & Melde, 2014).

All of the street socialization and attitudes towards violence variables included in this analysis were highly significant predictors in the models. However, the issue with these variables in cross-sectional data is that we cannot account for time ordering. We know that these friend-group behaviors and attitudes are significantly related to gang membership, but we cannot prove that they came before entrance into a gang. This issue was highlighted by Drake and Melde (2014), who found that their street socialization variable of being in the presence of alcohol or drugs with friends, along with variables measuring neutralizations, were significant in a cross-sectional model, but not in a time-lagged model.

The analyses presented here find some support for Vigil's model, and some evidence of external validity. Gang research has long acknowledged the role of marginalization in predicting gang membership, and we can see this is no less important in non-U.S. contexts. Our model results also speak to the relative importance of individual-level factors in explaining why some youth become gang involved while others do not. At the same time, it is evident that accounting for broader context is also important in explaining variations in gang joining. Although only one country-level predictor included in this model was significant, their inclusion as a whole helped explain 50% more of the variation in gang membership between countries than just individual-level predictors alone.

Perhaps more importantly from a policy perspective is the effect that neighborhoods had on gang involvement in our models. Youths' own perceptions of neighborhood context was an important predictor of their belonging to a gang, even in light of their relationship with their family and school. While Vigil (2010) has often emphasized better equipping schools and parents as socializing institutions to keep youth from gang life, our models suggest further attention should be paid to strengthening communities in general as socializing institutions. The notable effect of culture as indicated by language spoken at home further suggests policies geared towards maintaining cultural ties for minority youth. Supplementing communities with culture-specific organizations or increasing the cultural competency of public schools (Vigil, 2010) may serve as protective forces against youth gang involvement.

Limitations

There were several limitations to the current study that require mention, primarily related to our use of secondary cross-sectional data. First, we were constrained to the specific wording and questions asked in the original survey. The current study was unable to measure youth ties to law enforcement. Thus, this source of social control was not accounted for in our models. Even for those variables we were able to include, these measures are imperfect, and do not capture the full essence of the MM framework's qualitative components. Items were taken from scales meant to test other criminological theories and constructs, and their wording reflects that. However, these measures allowed exploration of this complex framework of gang membership incorporating macro- and micro-level factors, even if in a more simplistic manner than desired.

Next, as mentioned above, due to the cross-sectional nature of these data we are unable to establish time-ordering in our models. It may be the case that youth who are gang-involved are more inclined to report poor family ties, engaging in deviant peer activities, and so on. This concern is well supported by Drake and Melde's (2014) study of MM and gang formation, in which they found different results depending on whether their model was a cross-sectional versus a time-lagged test. The dynamic nature of Vigil's (1988; 2002) framework may lend itself better to a longitudinal assessment.

Finally, we found that country-level variation was important in predicting individual-level gang membership; however, future research should incorporate different or additional country-level predictors than were possible with the current models. In particular, there may be more suitable measures of poverty that can be incorporated in future analyses, such as the AROPE (at risk of poverty and social exclusion) measure that is available through the European Union Survey of Income and Living Conditions (EU-SILC) (Eurostat, n.d.). Unfortunately, the AROPE measure was not available for all countries in our sample, and thus we were constrained to use the most inclusive, albeit imperfect measure of national poverty, but sensitivity analyses conducted with a more limited sample for which AROPE estimates were available showed that poverty, as measured more appropriately, may be an important country-level predictor of gang membership in this framework. Importantly, incorporating measures of race and ethnicity as well as ethno-racial heterogeneity would be valuable for future specifications of this model, both at the country level and individual level. While Pyrooz and colleagues (2010) point to the importance of structural ethno-racial heterogeneity, other findings that MM predictors vary across ethno-racial group in the US might apply similarly in other countries as well. Despite these limitations, however, this study provides value in being the most complete quantitative assessment of Vigil's (1988) MM framework to date, and is able to provide partial support for some of the components outlined in the MM model.

Conclusion

The veracity of Vigil's (2002) model of minority youth gang involvement is important to assess because of the large share of street gangs who are minority youth (Howell, 2015). Quantitatively testing key variables related to marginalization, especially in a diverse sample of nations and youth, can tell us whether we are hitting the mark with regard to the processes by which many minority youth join gangs. Overall, this study found support for many factors involved in Vigil's MM framework, although the study is limited by cross-sectional data in terms of testing the exact dynamics proposed. Across nineteen European countries, elements of the MM framework were found to significantly predict gang membership, as defined by the Eurogang consensus group. Our findings also indicate that including country-level predictors is important in understanding gang membership across different country contexts, although future research should attempt to incorporate different measures such as ethno-racial heterogeneity. Future research should also look at how the framework functions within each country, and whether it fits similarly well. Although longitudinal research is unlikely to be accomplished at the scale of this research, longitudinal assessment in a context outside of the US would be helpful in understanding whether the dynamics Vigil proposes translate across national contexts.

Notes

1. According to Vigil (1999), "*Cholo"* is derived from the Spanish *solo* (alone), and has been used to describe a sense of racial and cultural marginality experienced by natives during the early Spanish colonial period. Today, it is a label depicting a street lifestyle, particularly among gang members who are marginalized from mainstream society" (p. 271). Choloization refers to a process by which marginalized individuals fail to fully assimilate to Anglo culture, adopting instead a cholo identity and lifestyle (Vigil, 1988; Lopez and Brummett, 2003).

2. Their models excluded macro-historical and macro-structural forces, and the authors rationalized this by saying Vigil (2002) himself said it would be difficult to impact these forces through intervention.
3. As will be shown in Table 2, although 12-15 year-olds may have been the target sample, sixteen to eighteen year-olds ended up comprising about 8% of the total sample.
4. https://www.europeansocialsurvey.org/
5. Previous studies did not include this question, and while they do not explicitly explain why, we believe it is because it was not asked in France (Gatti, Haymoz, & Schadee, 2011; Haymoz, Maxson, & Killias, 2014). The authors felt it was an important aspect of the youth gang definition, so we included this question for all countries except for France.
6. Country acronyms are as follows: AM = Armenia; AN = NL Antilles; *AT = Austria; AW = Aruba; BA = Bosnia and Herzegovina; *BE = Belgium; *CH = Switzerland; *CY = Cyprus; CZ = Czech Republic; *DE = Germany; *DK = Denmark; *EE = Estonia; *ES = Spain; *IE = Ireland; IS = Iceland; IT = Italy; *FI = Finland; *FR = France; *HU = Hungary; LT = Lithuania; *NL = Netherlands; *NO = Norway; *PL = Poland; *PT = Portugal; *RU = Russia; *SE = Sweden; *SI = Slovenia; SR = Suriname; US = United States; VE = Venezuela. * indicates the country was included in the final sample for analyses (N=19)
7. Note that in the current study, data from the European Social Survey were used solely to construct aggregate predictor variables as measures of country context. All individual-level variables, including the gang membership outcome variable were obtained from the ISRD-2.
8. These tables are available upon request.
9. The main difference between our inclusion of theoretical levels and those of Freng and Esbensen's (2007) is that variables measuring attitudes towards violence, which are similar to some of Freng and Esbenson's (2007) items in their neutralization index (shown in Appendix B), are included as the final step in the model, rather than as part of the formal social control of law enforcement. We feel that this makes more sense in terms of time ordering, as street socialization would be likely to influence adoption of these attitudes/use of these techniques, not the other way around, and correspond with Vigil's concept of "street identity".
10. https://www.stata.com/manuals/memelogit.pdf
11. The parental supervision variable was removed from the final models because it was perfectly predicted by the responses to parents knowing friends.

References

Aebi, M. (2009). Enqueˆtes de de´linquance autoreporte´e en Europe [Assessing deviance, crime and prevention in Europe]. Fle´mal: Communaute´ Europe´enne sur les presses de l'imprimerie.

Baumer, E. P., & Arnio, A. N. (2012). Multi-level modeling and criminological inquiry. In D. Gadd, S. Karstedt, & S. F. Messner (Eds.), *The SAGE handbook of criminological research methods* (pp. 97-110), Thousand Oaks, CA: SAGE Publishing.

Bursik, R., & Grasmick, H. G. (1993). *Neighborhoods and crime: The dimensions of effective community control*. New York, NY: Lexington Books.

Caldwell, B. (2010). Latinas' experiences in relation to gangs: Intersectionality of race, class, gender, and the state. *Georgetown Journal of Law & Modern Critical Race Perspective*, *2*, 19.

Cephus-Wilson, C. L. (2012). *I am who you say I am; I am what you make me. An exploratory analysis of gangs in the heartland* (Unpublished doctoral dissertation). Oklahoma State University, OK.

Decker, S. H., Melde, C., & Pyrooz, D. C. (2013). What do we know about gangs and gang members and where do we go from here?. *Justice Quarterly*, *30*(3), 369-402.

Decker, S. H., Van Gemert, F., & Pyrooz, D. C. (2009). Gangs, migration, and crime: The changing landscape in Europe and the USA. *Journal of International Migration and Integration/Revue de l'integration et de la migration internationale, 10*(4), 393-408.

Densley, J. A. (2015). Joining the Gang: A Process of Supply and Demand. *The Handbook of Gangs*, 235-256.Drake, G. & Melde, C. (2014) The problem of prediction: the efficacy of Multiple Marginality in cross-sectional versus prospective models. *Journal of Crime and Justice, 37*(1), 61-78.

Enzmann, D., Marshall, I. H., Killias, M., Junger-Tas, J., Steketee, M., & Gruszczynska, B. (2010). Self-reported youth delinquency in Europe and beyond: First results of the Second International Self-Report Delinquency Study in the context of police and victimization data. *European Journal of Criminology, 7*, 159-183.

Enzmann, D., H. Marshall, I., Killias, M., Junger-Tas, J., Steketee, M., & Gruszczynska, B. (2015). *Second International Self-Reported Delinquency Study, 2005-2007*. Inter-university Consortium for Political and Social Research [distributor].

Eurostat (n.d.). European Union Statistics on Income and Living Conditions (EU-SILC). Retrieved [May 7, 2020] from https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions

Freng, A., & Esbensen, F. A. (2007). Race and gang affiliation: An examination of Multiple Marginality. *Justice Quarterly, 24*(4), 600-628.

Gatti, U., Haymoz, S., & Schadee, H. M. A. (2011). Deviant youth groups in 30 countries: Results from the Second International Self-Report Delinquency Study. *International Criminal Justice Review, 21*(3), 208–224.

Haymoz, S., Maxson, C., & Killias, M. (2014). Street gang participation in Europe: A comparison of correlates. *European Journal of Criminology, 11*(6), 659–681.

Howell, J.C. (2015). *The history of street gangs in the United States: Their origins and transformations.* Lanham, MD: Lexington Books.

Howell, J.C. & Griffiths, E. (2019). *Gangs in America's Communities.* Thousand Oaks, CA: Sage Publications.

Hirschi, T. (1969). *Causes of delinquency*. Berkeley: University of California Press.

Klein, M. W. (2007). *Chasing after street gangs: A forty-year journey*. Upper Saddle River, NJ: Pearson Prentice Hall.

Krohn, M. D., Schmidt, N. M., Lizotte, A. J., & Baldwin, J. M. (2011). The impact of Multiple Marginality on gang membership and delinquent behavior for Hispanic, African American, and white male adolescents. *Journal of Contemporary Criminal Justice, 27*(1), 18-42.

Lee, S. (2016). *Asian gangs in the United States: A meta-synthesis* (Unpublished Master's Thesis). Retrieved from https://core.ac.uk/download/pdf/60589284.pdf.

Lopez, D. A., & Brummett, P. O. D. (2003). Gang membership and acculturation: ARSMA-II and choloization. *Crime & Delinquency*, *49*(4), 627-642.

Lösel, F. (2001). Nonviolence: Protective factors. In Smelser, N. J., & Baltes, P. B. (Eds.), *International encyclopedia of the social & behavioral sciences* (pp. 10706-10711). Amsterdam: Elsevier.

Luke, D. A. (2004). *Multilevel modeling* (Vol. 143). Sage Publishing.

Page, B., & Marcelin, L. H. (2003). Formation of gangs and involvement in drug use among marginalized youth: Uses of the anthropological view. *Free Inquiry In Creative Sociology, 31*(2), 175-182.

Pyrooz, D. C., & Densley, J. A. (2016). Selection into street gangs: Signaling theory, gang membership, and criminal offending. *Journal of Research in Crime and Delinquency*, *53*(4), 447-481.

Pyrooz, D. C., Fox, A. M., & Decker, S. H. (2010). Racial and ethnic heterogeneity, economic disadvantage, and gangs: A macro-level study of gang membership in urban America. *Justice Quarterly, 27*(6), 867-892.

Quinn, K., Walsh, J. L., & Dickson-Gomez, J. (2018). Multiple marginality and the variation in delinquency and substance use among adolescent gang members. *Substance Use & Misuse,* 1–16.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Sage Publishing.

Shaw, C. R., & McKay, H. D. (1942). *Juvenile delinquency and urban areas: A study of rates of delinquents in relation to differential characteristics of local communities in American cities*. Chicago, IL: The University of Chicago Press.

United Nations Population Division. (2017). *Trends in total migrant stock: 2017 revision.* Retrieved [March 21, 2019] from https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates15.asp

Van Gemert, F., & Weerman, F. (2015). Understanding European gangs. In S. H. Decker & D. C. Pyrooz (Eds.), *The handbook of gangs* (pp. 503-19). John Wiley & Sons, Inc.

Van Ngo, H., Calhoun, A., Worthington, C., Pyrch, T., & Este, D. (2017). The unravelling of identities and belonging: Criminal gang involvement of youth from immigrant families. *Journal of International Migration and Integration, 18*(1), 63-84.

Ventura Miller, H., Barnes, J. C., & Hartley, R. D. (2011). Reconsidering Hispanic gang membership and acculturation in a multivariate context. *Crime & Delinquency, 57*(3), 331-355.

Vigil, D. (1979). Adaptation strategies and cultural life styles of Mexican American adolescents. *Hispanic journal of behavioral sciences, 1*(4), 375-392.

Vigil, J. D. (1983). Chicano gangs: One response to Mexican urban adaptation in the Los Angeles area. *Urban anthropology, 12*(1), 45-75.

Vigil, J. D. (1988). *Barrio gangs: Street life and identity in Southern California*. Austin, TX: University of Texas Press.

Vigil, D. (2002). *A rainbow of gangs: Street cultures in the mega-city.* Austin, TX: University of Texas Press.

Vigil, J. D. (2003). Urban violence and street gangs. *Annual Review of Anthropology, 32*(1), 225-242.

Vigil, J. D. (2010). *Gang redux: A balanced anti-gang strategy.* Long Grove IL: Waveland Press.

Weerman, F. M., Maxson, C. L., Esbensen, F. A., Aldridge, J., Medina, J., & van Gemert, F. (2009). *Eurogang program manual.* University of Missouri-St. Louis. Online report.

Wolfgang M. E., & Ferracuti F. (1967). *The subculture of violence.* London, UK: Tavistock.

World Bank. (n.d.). World development indicators. Retrieved [March 21, 2019] from https://datacatalog.worldbank.org/

Figure 1. Multiple Marginality Framework

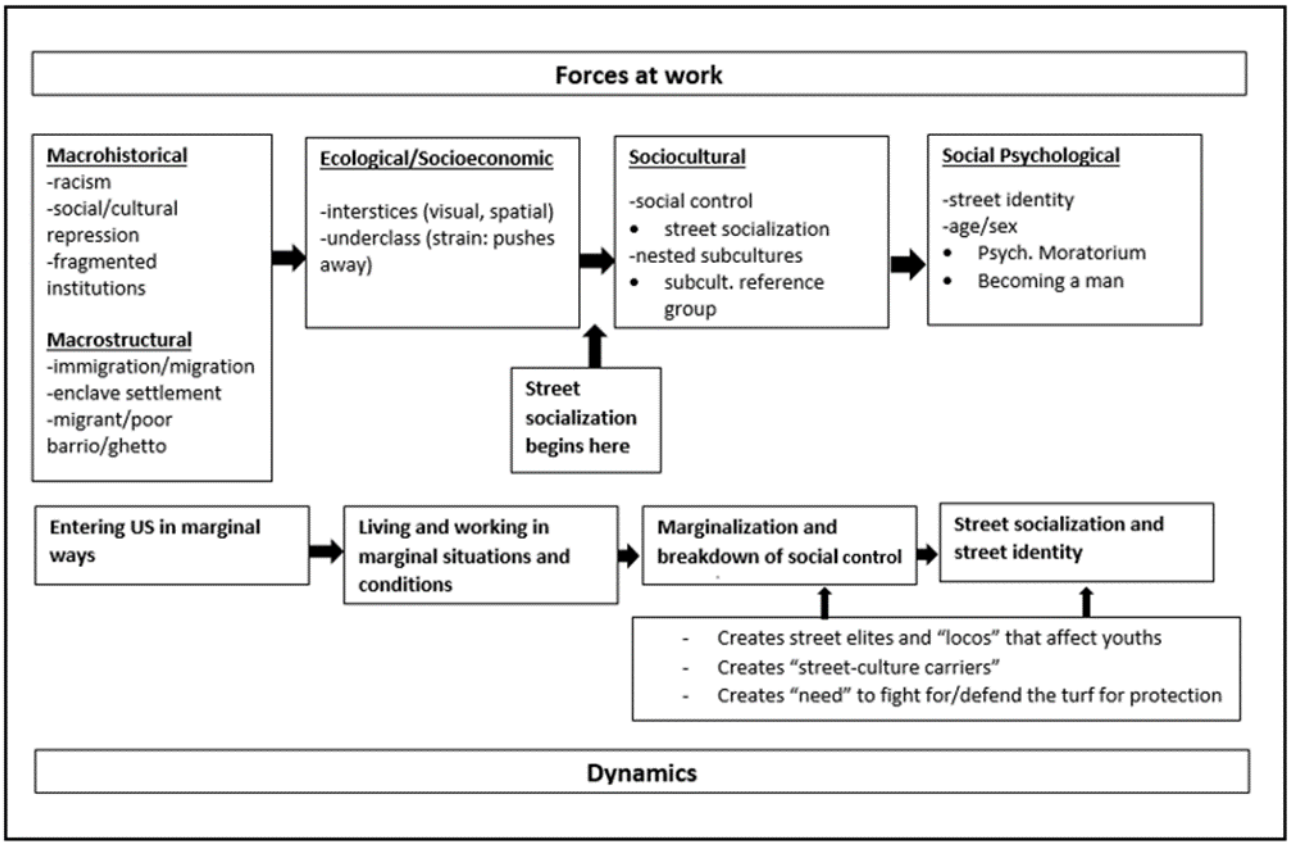
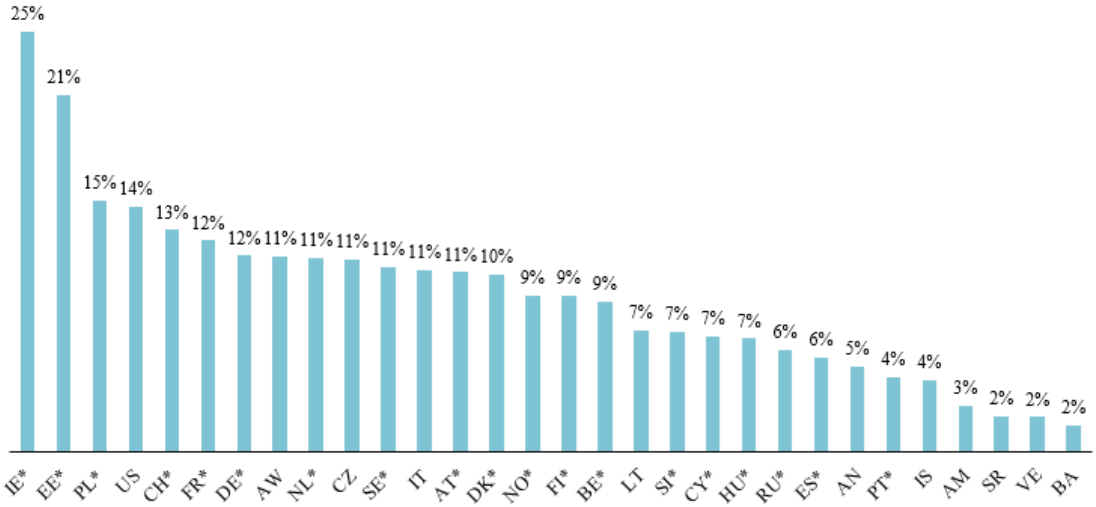


Figure 2. Gang Membership in Sample by Country



* = Country included in regression analyses

Table 1. Descriptive Statistics for Country-level Variables

Measures	N	Mean (SD)	Min	Max
Total country sample	30			
% Migrants	29	10.1 (5.8)	BA (1.2)	AW (32.5)
Attitudes towards immigration	19	20.7 (2.9)	RU (15.3)	SE (26.1)
Discrimination (ln)	19	-3.9 (0.7)	PL (-5.2)	EE (-2.0)
Gini coefficient	27	32.8 (5.8)	SI (24.6)	VE (52.4)
Poverty	27	6.9 (15.7)	CY (0.0)	AM (68.7)
Victimized last 5 years	19	0.2 (0.06)	CY (0.1)	FI (0.29)
Worry about victimization	19	2.6 (0.4)	NO (2.0)	FR (3.3)
European subsample	19			
% Migrants	19	10.3 (5.1)	PL (1.9)	CH (24.4)
Attitudes towards immigration	19	21.0 (3.1)	RU (15.3)	SE (26.1)
Discrimination (ln)	19	-3.9 (0.7)	PL (-5.2)	EE (-2.0)
Gini coefficient	19	31.4 (4.3)	SI (24.6)	RU (41.3)
Poverty	19	2.5 (4.2)	CY (0.0)	RU (14.7)
Victimized last 5 years	19	0.2 (0.06)	CY (0.1)	FI (0.29)
Worry about victimization	19	2.6 (0.4)	NO (2.0)	FR (3.3)

Note. SD = standard deviation. Country abbreviations noted in Min and Max columns.

Table 2. Descriptive Statistics for Individual-level Variables

Measure	Total Sample %	Highest %	European Subsample %	Highest %
Demographics				
Gender	(m=.2)		(m=.2)	
Male	49.3	IE (52.5)	49. 8	IE (52.5)
Age	(m=.7)		(m=.5)	
12-15	91.5	BA (99.1)	91.8	SI (98.8)
16-18	7.9	SR (32.5)	7.8	EE (15.7)
Economic marginalization				
Parental employment	(m=1.1)		(m=1.2)	
Neither	3.9	BA (11.2)	4.2	FR (10.8)
One	28.6	AM (48.2)	27.7	ES (36.4)
Both	66.5	SI (80.8)	66.9	SI (80.8)
Own room	(m=.3)		(m=.3)	
No	24.4	VE (49.4)	19.8	RU (39.0)
Traditional family (live with mom+dad)	(m=.5)		(m=.5)	
No	27.2	AN (48.7)	26.9	EE (38.1)
Social marginalization				
Origin of self and friend group*	(m=.8)		(m=.9)	
Non-native, friends mostly non-native	9.0	FR (37.8)	12.2	FR (37.8)
Non-native, friends mostly native	13.1	AW (32.6)	14.1	CH (20.6)
Native	77.1	PL (97.7)	72.8	PL (97.7)
Language spoken at home	(m=6.5)		(m=.5)	
Not from country	9.0	AW (32.5)	10.9	EE (24.5)
From country	84.5	PL (98.8)	88.6	PL (98.8)
Discrimination	(m=.6)		(m=.6)	
Yes	12.2	US (25.6)	12.1	DK (22.3)
Neighborhood environment	n=65,628		n=41,968	
Neighborhood index (mean, SE)	0.57 (.002)	BA (.82); Lowest: PL (.39)	0.59 (.002)	CY (.80); Lowest: PL (.38)
Ties to family				
Get along with parents very well	(m=.8)		(m=.9)	
Neither	20.0	PT (63.4)	20.9	PT (63.4)
One	23.5	AN (33.0)	22.5	RU (31.3)
Both	55.7	CY (83.3)	55.7	CY (83.3)
Parents know friends	(m=5.2)		(m=5.7)	
Sometimes/never	39.3	EE (65.2)	41.3	EE (65.2)
Always	55.5	ES (73.7)	53.0	ES (73.7)
Parental supervision	(m=1.3)		(m=1.4)	
Sometimes/never	39.3	EE (65.2)	41.3	EE (65.2)
Always	59.4	ES (76.2)	57.3	ES (76.2)
Ties to school				

Time spent on homework	(m=1.9)		(m=1.6)	
Half hour or less	35.0	FI (67.5)	36.9	FI (67.5)
Hour or more	63.1	RU (83.1)	61.5	RU (83.1)
Likes school	(m=.9)		(m=1.0)	
Dislikes	38.2	SI (68.8)	41.3	SI (68.8)
Repeated a grade	(m=.6)		(m=.7)	
At least once	15.7	SR (67.7)	15.0	FR (36.8)
Never	83.7	AM (99.2)	84.3	RU (97.9)
Truancy	(m=.7)		(m=.8)	
At least once	27.9	AM (61.5)	26.2	EE (49.8)
Never	71.4	CZ (94.6)	73.0	BE (84.5)
Achievement	(m=1.4)		(m=1.4)	
Below average	9.8	VE (19.6)	9.3	BE (13.7)
Average or above	88.8	SR (94.8)	89.3	CY (93.7)
Would miss school if moved	(m=1.3)		(m=1.2)	
Not true	21.7	FR (37.4)	23.7	FR (37.4)
Teachers notice and say doing well	(m=1.8)		(m=1.8)	
Not true	23.0	EE (35.0)	25.0	EE (35.0)
Likes school	(m=2.4)		(m=2.3)	
Not true	27.5	FR (41.0)	30.2	FR (41.0)
Street socialization				
Friend group drinks a lot/takes drugs	(m=2.2)		(m=2.0)	
Sometimes+	20.4	EE (43.2)	24.1	EE (43.2)
Never	77.4	AM (95.4)	74.0	CY (89.7)
Friend group vandalizes	(m=2.0)		(m=1.8)	
Sometimes+	15.2	IE (22.9)	15.8	IE (22.9)
Never	82.9	AM (89.6)	82.4	PT (88.9)
Friend group shoplifts for fun	(m=2.4)		(m=2.2)	
Sometimes+	8.0	FR (54.9)	9.4	FR (54.9)
Never	89.6	LT (96.7)	88.5	RU (95.5)
Friend group frightens/annoys for fun	(m=3.7)		(m=3.9)	
Sometimes+	25.1	US (38.5)	25.2	DE (35.0)
Never	71.2	AM (88.2)	70.9	RU (86.6)
Attitudes towards violence				
Need to use force to gain respect	(m=1.8)		(m=1.5)	
Agree	18.4	AW (34.9)	15.6	RU (26.9)
Somebody attacks, will hit back	(m=2.2)		(m=1.8)	
Agree	66.1	AM (82.8)	63.6	NL (82.0)
Normal for boys to prove selves with fights	(m=1.7)		(m=1.5)	
Agree	40.4	AT (59.6)	39.9	AT (59.6)

* We do not break out the native category by the origin of their friend group, as a relatively small percentage (8%) of the native youth reported having mostly non-native friends.

Table 3. Logistic Regression Results for MM indicators on Gang Involvement

	Model 2			Model 3			Model 4			Model 5		
Variables	Coef.	S.E.	OR	Coef.	S.E.	OR	Coef.	S.E.	OR	Coef.	S.E.	OR
Constant	**-2.50*****	(0.11)	0.08	-1.38^{+}	(0.83)	0.25	-0.93	(0.85)	0.40	-0.71	(0.82)	0.49
Demographics												
Male	**0.51*****	(0.03)	1.66	**0.51*****	(0.03)	1.66	**0.52*****	(0.03)	1.68	**0.50*****	(0.03)	1.65
Age - 16-18[a]	**0.52*****	(0.05)	1.69	**0.52*****	(0.05)	1.68	**0.49*****	(0.05)	1.64	**0.44*****	(0.05)	1.56
Country context												
Income inequality				-0.02	(0.03)	0.98	-0.01	(0.03)	0.99	-0.01	(0.03)	0.99
Poverty				0.04	(0.03)	1.04	0.04	(0.03)	1.04	0.03	(0.03)	1.03
Percent migrant				0.02	(0.02)	1.02	0.03	(0.02)	1.03	0.03	(0.02)	1.03
Discrimination (ln)				0.27	(0.21)	1.32	0.25	(0.21)	1.29	0.29	(0.21)	1.34
Crime victimization				0.46	(2.08)	1.59	-0.16	(2.12)	0.85	0.46	(2.05)	1.58
Worry about victimization				-0.19	(0.31)	0.83	-0.13	(0.32)	0.88	-0.33	(0.31)	0.72
Attitudes towards immigration				**0.09***	(0.04)	1.10	**0.09***	(0.04)	1.10	**0.09***	(0.04)	1.10
Economic marginalization												
Parental employ. - one parent[b]							-0.06	(0.08)	0.94	-0.04	(0.08)	0.96
Parental employ. - both parents[b]							-0.02	(0.08)	0.98	0.03	(0.08)	1.03
Own room							**0.12****	(0.04)	1.13	**0.17*****	(0.04)	1.18
Live with mom and dad							**-0.41*****	(0.04)	0.66	**-0.28*****	(0.04)	0.75
Social marginalization												
Household language of the country							**0.26*****	(0.06)	1.30	**0.30*****	(0.06)	1.35
Never discriminated against							**-0.32*****	(0.05)	0.73	**-0.21*****	(0.05)	0.81
Non-native, friends with mostly natives[c]							**-0.34*****	(0.06)	0.71	**-0.27*****	(0.06)	0.77
Native[c]							**-0.28*****	(0.06)	0.76	**-0.17****	(0.06)	0.84
Neighborhood context												
Neighborhood index										**-0.96*****	(0.03)	0.38
Level-2 Variance	0.221	(0.07)		0.114	(0.04)		0.119	(0.04)		0.111	(0.04)	
N	42,715			42,715			41,615			40,229		

BIC	28235.44	28297.95	27412.23	25697.36

Note: Bold+ = p<0.10; Bold* = p<0.05; Bold** = p<0.01; Bold*** = p<0.001. Reference groups: a=12-15; b = Neither; c= Non-native, friends with mostly non-native; d=Neither

	Model 6			Model 7			Model 8			Model 9		
Variables	Coef.	S.E.	OR	Coef.	S.E.	OR	Coef.	S.E.	OR	Coef.	S.E.	OR
Constant	0.94	(0.77)	2.56	**2.41****	(0.75)	11.10	**2.38****	(0.76)	10.78	**1.62*****	(0.19)	5.07
Demographics												
Male	**0.32*****	(0.04)	1.37	0.07	(0.04)	1.07	0.01	(0.04)	1.01	0.01	(0.04)	1.01
Age - 16-18[a]	**0.18****	(0.06)	1.19	0.06	(0.07)	1.06	0.09	(0.07)	1.10	0.09	(0.07)	1.10
Country context												
Income inequality	0.02	(0.03)	1.02	0.02	(0.03)	1.02	0.02	(0.03)	1.02			
Poverty	0.01	(0.03)	1.01	0.02	(0.03)	1.02	0.01	(0.03)	1.01			
Percent migrant	0.02	(0.02)	1.02	0.02	(0.02)	1.02	0.02	(0.02)	1.02			
Discrimination (ln)	**0.32**[+]	(0.19)	1.38	0.22	(0.18)	1.24	0.19	(0.19)	1.21			
Crime victimization	-0.83	(1.89)	0.44	-0.18	(1.83)	0.84	-0.25	(1.87)	0.78			
Worry about victimization	-0.31	(0.29)	0.73	-0.06	(0.28)	0.94	0.05	(0.29)	1.05			
Attitudes towards immigration	**0.12****	(0.04)	1.12	**0.09***	(0.04)	1.10	**0.08***	(0.04)	1.09			
Economic marginalization												
Parental employ. - one parent[b]	-0.03	(0.09)	0.97	-0.10	(0.11)	0.91	-0.12	(0.11)	0.88	-0.12	(0.11)	0.89
Parental employ. - both parents[b]	0.03	(0.09)	1.03	-0.11	(0.11)	0.90	-0.12	(0.11)	0.89	-0.12	(0.11)	0.89
Own room	**0.15****	(0.05)	1.16	0.07	(0.06)	1.07	0.06	(0.06)	1.07	0.07	(0.06)	1.07
Live with mom and dad	**-0.13****	(0.04)	0.88	**-0.11***	(0.05)	0.89	**-0.12***	(0.05)	0.89	**-0.12***	(0.05)	0.89
Social marginalization												
Household language of the country	**0.29*****	(0.07)	1.34	**0.25****	(0.08)	1.28	**0.27*****	(0.08)	1.30	**0.26*****	(0.08)	1.30
Never discriminated against	**-0.15****	(0.05)	0.86	-0.05	(0.06)	0.96	-0.06	(0.06)	0.95	-0.06	(0.06)	0.95
Non-native, friends with mostly natives[c]	**-0.15***	(0.07)	0.86	**-0.15**[+]	(0.08)	0.86	-0.09	(0.08)	0.92	-0.09	(0.08)	0.91
Native[c]	-0.10	(0.06)	0.91	**-0.22****	(0.07)	0.81	**-0.16***	(0.07)	0.86	**-0.16***	(0.07)	0.85
Neighborhood context												
Neighborhood index	**-0.60*****	(0.04)	0.55	**-0.25*****	(0.04)	0.78	**-0.23*****	(0.04)	0.79	**-0.23*****	(0.04)	0.79
Family ties												
Get along with one parent very well[d]	0.00	(0.05)	1.00	0.07	(0.06)	1.07	0.06	(0.06)	1.07	0.06	(0.06)	1.06
Get along with both very well[d]	**-0.12****	(0.05)	0.88	0.06	(0.05)	1.06	0.05	(0.05)	1.05	0.05	(0.05)	1.05

Parents know friends always	**-0.81*** **	(0.04)	0.45	**-0.46*** **	(0.04)	0.63	**-0.43*** **	(0.05)	0.65	**-0.43*** **	(0.05)	0.65
School ties												
Spend hour+ on homework	**-0.48*** **	(0.04)	0.62	**-0.24*** **	(0.04)	0.79	**-0.22*** **	(0.04)	0.80	**-0.22*** **	(0.04)	0.80
Like school	**-0.33*** **	(0.04)	0.72	**-0.14** **	(0.05)	0.87	**-0.11***	(0.05)	0.89	**-0.11***	(0.05)	0.90
Never repeated a grade	**-0.17** **	(0.05)	0.84	-0.03	(0.06)	0.97	0.02	(0.06)	1.02	0.01	(0.06)	1.01
Never truant	**-0.83*** **	(0.04)	0.44	**-0.34*** **	(0.05)	0.71	**-0.33*** **	(0.05)	0.72	**-0.33*** **	(0.05)	0.72
Average+ achievement	**-0.25*** **	(0.05)	0.78	-0.07	(0.06)	0.93	-0.05	(0.06)	0.95	-0.05	(0.06)	0.95
Would miss school if moved	**0.11***	(0.04)	1.12	**0.10***	(0.05)	1.11	**0.11***	(0.05)	1.11	**0.11***	(0.05)	1.11
Teachers notices doing well	**-0.12** **	(0.04)	0.89	**-0.18*** **	(0.05)	0.83	**-0.19*** **	(0.05)	0.83	**-0.19*** **	(0.05)	0.83
Like their school	**-0.09***	(0.05)	0.91	0.00	(0.05)	1.00	0.01	(0.05)	1.01	0.01	(0.05)	1.01
Street socialization												
Friend group never drinks/takes drugs a lot				**-1.53*** **	(0.05)	0.22	**-1.51*** **	(0.05)	0.22	**-1.52*** **	(0.05)	0.22
Friend group never shoplifts				**-1.26*** **	(0.05)	0.28	**-1.20*** **	(0.05)	0.30	**-1.19*** **	(0.05)	0.30
Friend group never vandalizes				**-0.68*** **	(0.06)	0.51	**-0.65*** **	(0.06)	0.52	**-0.64*** **	(0.06)	0.53
Friend group never frightens/annoys for fun				**-0.64*** **	(0.05)	0.53	**-0.60*** **	(0.05)	0.55	**-0.60*** **	(0.05)	0.55
Attitudes towards violence												
Not necessary to use force to gain respect							**-0.20*** **	(0.05)	0.82	**-0.21*** **	(0.055)	0.81
Not fight back if someone attacks							**-0.30*** **	(0.06)	0.74	**-0.30*** **	(0.06)	0.74
Not normal for boys to prove selves via fights							**-0.22*** **	(0.04)	0.80	**-0.22*** **	(0.05)	0.80
Level-2 Variance	0.0925	(0.03)		0.0836	(0.03)		0.0877	(0.03)		0.166	(0.06)	
N	36,349			34,821			34,296			34,296		
BIC	22022.25			17348.28			17014.55			16952.41		

Note: Bold+ = p<0.10; Bold* = p<0.05; Bold** = p<0.01; Bold*** = p<0.001. Reference groups: a=12-15; b = Neither; c= Non-native, friends with mostly non-native; d=Neither

Appendix A: Conceptualization of Vigil's Multiple Marginality

MM Construct	Measures used in Prior Tests of MM Model
Economic marginalization	Parental/Caretaker education; Employment; Household structure; Age mother first gave birth; Financial stress; Per capita family income
Social marginalization	Social isolation; Ethnic identity; Perceived racial discrimination; Ethnic marginalization; Discrimination motivated victimization; Speak Spanish at home; Language spoken; Social assimilation
Neighborhood and social environment	Collective monitoring; Neighborhood disorder; Neighborhood drug availability; Neighborhood attachment; Social assimilation
Ties to family	Parental monitoring; Parental supervision; Parental attachment; Positive parenting; Family communication; Living with parents/guardians; Parental investment; Parent/guardian drug use; Family gang involvement; Parent/guardian incarceration
Ties to school	School enrollment; School involvement; School commitment; Attachment to teacher; School support; School connectedness; School satisfaction; Academic achievement; Low school adjustment; Trouble at school; Limited educational opportunity; Educational expectations
Ties to law enforcement	Views on law enforcement; Attitude towards police; Negative police interaction
Neutralization	Techniques of neutralization
Street socialization	Spend time with friends with drugs and alcohol; Risky time with friends

Appendix B: Conceptualization, Operationalization, and Justification of Individual-Level Measures (Including Similar Prior Measures and their Tests)

Construct	Conceptualization	Operationalization	Prior Measures	Prior Test+	Justification for Inclusion
Economic marginalization	Employment	Does your father (or the man you live with) have a job?	Parent(s) employment	Cephus-WIlson (2012)	MM framework emphasizes role of economic disadvantage; parental employment included as proxy for socioeconomic status; used as part of socioeconomic level of respondents in prior study.
		Does your mother (or the woman you live with) have a paid job?			
	Household structure	Are you living with your own mother and father?	From single parent household	**Drake & Melde (2014)**	Household structure used as proxy for family income in prior study.
	Crowded housing	Do you have a room of your own?			Vigil (2003) mentions crowded housing as one factor that displays economic marginalization.
Social marginalization	Discrimination	Have people ever treated you badly because of your religion or the language you speak, or the color of your skin?	12 items asking how often they have perceived discrimination due to their culture (e.g. someone yelled a racial slur at you--other items not mentioned in text)	Hautala et al (2016)	Vigil (1988) suggests that discrimination is related to social marginalization.
			During the past 12 months, how many times on school property were you harassed or bullied for…	Estrada et al (2013)	
			...your race, ethnicity, or national origin		
			...your religion		
	Language	What language do you most often speak with the persons you live with?	Whether primary caregiver spoke Spanish at home	**Krohn et al (2011)**	Previously used to capture an element of acculturation (language), which has been examined by Vigil (1979, 1983) as an aspect of social marginalization.
			What languages do you usually speak at home?	**Ventura Miller, Barnes, & Hartley (2011)**	
	Social assimilation	Were you born in this country?	Your close friends are...? (all Mexican, more Mexican than White (or others), about half Mexican and half White (or others), more White (or others) than Mexican, only White)	**Ventura Miller, Barnes, & Hartley (2011)**	Previously used to capture an element of acculturation (social assimilation), which has been examined by Vigil (1979, 1983) as part of social marginalization; the origin of the child and their parents helps understand the level of acculturation necessary.
		Was your mother born in this country?			
		Was your father born in this country?			
		How many of your friends have parents of a foreign origin?			
Neighborhood and social environment	Collective monitoring	My neighbors notice when I am misbehaving and let me know	How likely is it that adults in your neighborhood would intervene if children or teenagers were hanging out in the street?	Quinn et al (2018)	Characteristics of neighborhoods are not explicit as a factor in the MM framework, but implicit through inclusion of macro-structural forces that lead to enclave settlements (Vigil, 2010), and the idea that economic marginalization may concentrate in neighborhoods contributing to an "underclass" (Vigil, 2003); we include the entire scale on neighborhood quality, consisting of items related to neighborhood disorder, attachment, and cohesiveness (Marshall & Enzmann, 2012), to get a comprehensive perspective on neighborhood influence, as it had been excluded from most prior quantitative tests and the qualities of the neighborhoods most important to the MM framework were not fully specified by Vigil.
	Neighborhood crime/disorder	There is a lot of drug selling	How often does drug dealing occur in your neighborhood	Quinn et al (2018)	
			Has anyone in your neighborhood offered you... [6 drug options]?	**Ventura Miller, Barnes, & Hartley (2011)**	
		There is a lot of crime in my neighborhood			

		There is a lot of fighting			
		There are a lot of empty and abandoned buildings			
		There is a lot of graffiti			
		People in this neighborhood generally don't get along with each other			
	Neighborhood attachment	If I had to move, I would miss the neighborhood			
		I like my neighborhood			
	Neighborhood cohesiveness	There is a lot of space for children to play			
		People around here are willing to help their neighbors			
		This is a close knit neighborhood			
		People in this neighborhood can be trusted			
Ties to family	Parental monitoring	Do your parents (or the adults you live with) usually know who you are with when you go out?	If their parents know who they are with if they are not at home.	**Drake & Melde (2014); Freng & Esbensen (2007)**	Parental monitoring is directly related to family-level social control and variation potentially related to levels of economic marginalization; similar items were used in prior studies to understand extent of parential monitoring of activities day and night.
		When you go out at night do your parents (or the family you live with) generally tell you at what time you have to be back?	5-items by Silverberg and Small (Li, Stanton, and Feigleman, 2000)--e.g. How often do your parents or guardians try to know where you go at night?	**Quinn et al (2018)**	
	Parental attachment	How do you usually get along with the man you live with (father, stepfather…)?	I can talk to my mother/father	**Drake & Melde (2014); Freng & Esbensen (2007)**	A primary source of weakened ties to the family is through parental attachment; prior studies have used a similar item within an index of parental attachment measures.
		How do you usually get along with the woman you live with (mother or stepmother)?			
Ties to school	School commitment	Do you usually like school?	I like school	**Drake & Melde (2014); Freng & Esbensen (2007)**	Items are included to understand school commitment, which is a component of the bond to school related to "engagements", or expression of striving for higher status (Vigil, 2002); prior studies have used similar measures within an index of school commitment.
		Outside school how much time do you spend on an average school day on each of these activities?: Doing homework	I usually finish my homework		
	School satisfaction	I like my school	I am satisfied with my school (Never, sometimes, most of the time)	**Ventura Miller, Barnes, & Hartley (2011)**	A measure of school satisfaction is also included as a component of the school bond, which needs to be weakened in order for street socialization to occur.
	School support	Teachers do notice when I am doing well and let me know	At my school, there is a teacher or some other adult who tells me when I do a good job	Estrada et al (2013)	Both of these items related to school support and connectedness provide a proxy for school attachment, another component of the school bond.
	School connectedness		I feel close to people at this school	Estrada et al (2013)	
			I am happy to be at this school		

			I feel like I am a part of this school		
		If I had to move, I would miss my school			
	Academic achievement		Self-reported average letter grade at Wave 4 (age 15.5)	**Krohn et al (2011)**	Prior research has included academic achievement and other school-related measures in their analyses of gang involvement, as Vigil (1999) suggests these school-related measures should be predictive of gang involvement (though his focus was on Hispanic individuals in particular). Academic achievement may also be an indicator of commitment to conventional society, and has been demonstrated to be a protective factor against antisocial behavior (Losel, 2001).
		How well do you do in school compared to other students in your class?			
		Have you ever been held back, did you ever have to repeat a grade?			
	Trouble at school		Whether they have gotten in trouble in school	Hautala et al (2016)	Vigil (1999) has linked gang membership with trouble at school, and truancy could be one way in which school social control mechanisms are "all but absent" (Vigil, 2003, p. 235).
		Did you ever stay away from school for at least a whole day without legitimate excuse in the last 12 months?			
Street socialization	Spend time with friends with drugs and alcohol	When you hang out with your friends, we usually... drink a lot of beer/alcohol or take drugs	Do youth spend time with friends in the presence of drugs and alcohol	**Drake & Melde (2014); Freng & Esbensen (2007)**	Street socialization is the process by which youth are molded "to conform to the ways of the street" and usually occurs within the context of peers (Vigil, 2002, p. 10; Vigil, 2004). Items are included that relate to deviant activities with peers, as have been used in prior studies.*
	Risky time with friends		The amount of time spent with the participant's 3 riskiest friends	**Krohn et al (2011)**	
	Other antisocial behavior with friends	... smash or vandalize things just for fun			
		... shoplift just for fun			
		... frighten and annoy people around us just for fun			
Street subculture/ identity	Attitudes towards violence/ Techniques of neutralization	If somebody attacks me, I will hit him/her back	Get into a physical fight with someone if they hit you first	**Drake & Melde (2014); Freng & Esbensen (2007)**	Vigil (2003) stated that "street socialization leads to a street subculture, and this is where and how the subculture of violence is learned and practiced... This concept... essentially maintains that a violent way of life dominates the streets" (p. 235). Therefore, attitudes towards violence are included in the model as proxies for components of the street subculture of violence and street identity that forms through street socialization. Those attitudes towards violence that aligned with values and norms that guide gang members' thinking, such as protection and respect (Vigil, 2009) are included. Two of these are also similar to items in prior research, categorized as techniques of neutralization.
		It is completely normal that boys want to prove themselves in physical fights with others	Get into a physical fight with someone if you have to stand up for your rights		
		One needs to make use of force to be respected			

+ Bolded studies are direct full or partial tests of the framework; others utilize the framework in some way but are not directly testing it.

*This operationalization is closely related to deviant peer relationships, a focus of much of the past social learning literature including that which contributed to the construction of the ISRD-2, and this is a limitation to the testing of the "street" aspect of the socialization process using secondary data; however, Vigil (2009) notes that "It is also true that most of the time spent by gang members is in the usual cavorting activities found in most adolescent and youth groups" so these characteristics might be especially hard to tease out quantitatively. According to Vigil, only violence against others and against themselves, taught to youth by their peers, "separate gangs from other adolescent peer networks" (2003; 2009, p. 7) and attitudes towards the former are incorporated in the following section.