

Journal of Research in Crime and Delinquency

<http://jrc.sagepub.com/>

Proximal Adolescent Outcomes of Gang Membership in England and Wales

Juan José Medina Ariza, Andreas Cebulla, Judith Aldridge, Jon Shute and Andy Ross

Journal of Research in Crime and Delinquency published online 22 July 2013
DOI: 10.1177/0022427813496791

The online version of this article can be found at:

<http://jrc.sagepub.com/content/early/2013/07/02/0022427813496791>

Published by:



<http://www.sagepublications.com>

On behalf of:

John Jay College of Criminal Justice, City University of New York

Additional services and information for *Journal of Research in Crime and Delinquency* can be found at:

Email Alerts: <http://jrc.sagepub.com/cgi/alerts>

Subscriptions: <http://jrc.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [OnlineFirst Version of Record](#) - Jul 22, 2013

[What is This?](#)

Proximal Adolescent Outcomes of Gang Membership in England and Wales

Journal of Research in Crime and

Delinquency

00(0) 1-32

© The Author(s) 2013

Reprints and permission:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/0022427813496791

jrcd.sagepub.com



Juan José Medina Ariza¹, Andreas Cebulla²,
Judith Aldridge¹, Jon Shute¹, and Andy Ross³

Abstract

Objectives: This article aims to apply a “turning points” framework for understanding the developmental impacts of gang membership in a British sample of young people. The study explores the proximal impact of gang membership on offending, victimization, and a number of attitudinal and experiential outcomes that have been theorized to mediate the relationship between gang membership and offending. *Method:* The authors used data from the Offending Crime and Justice Survey, a rotating panel representative of young people in England and Wales that measured gang membership using the Eurogang definition. The effects of gang membership onset were tested using a propensity score analysis approach. *Results:* As previously reported with American data, gang onset has an impact on offending, antisocial behavior, drug use, commitment to deviant peers, and neutralization

¹ University of Manchester, Manchester, UK

² Flinders University, Bedford Park, Australia

³ National Centre for Social Research, London, UK

Corresponding Author:

Juan José Medina Ariza, University of Manchester, Williamson Building, Oxford Road, Manchester M139PL, UK.

Email: juanjo.medina@manchester.ac.uk

techniques. In addition, gang membership increases the probability of unwanted police contact, even adjusting for offending through a “double robust” procedure. *Conclusion:* Despite differences in social context, history of gangs and level of violence, we encounter more similarities than differences regarding consequences of gang membership. The impact on unwanted police contact deserves further research and policy attention.

Keywords

gangs, comparative criminology/criminal justice, developmental theories, criminological theory, causes/correlates, crime

Introduction

The Impact of Gang Membership

There is a considerable body of U.S.-based literature linking gang membership to negative developmental outcomes. Early cross-sectional studies focused on offending as a correlate of gang membership; raising the question of whether gangs enhance offending, attract offenders, or a combination of both (Thornberry et al. 1993). During the last decade, we have seen a number of studies using longitudinal data and a variety of increasingly sophisticated analytical techniques to attempt to tease out the direction of this relationship (e.g., Barnes, Beaver, and Miller 2010; Gatti et al. 2005; Gordon et al. 2004; Haviland, Nagin, and Rosenbaum 2008; Melde and Esbensen 2011a). As Krohn and Thornberry (2008:147) concluded in relation to the impact of gang membership on offending: “the safest conclusion to draw is that there is a minor selection effect, a major facilitation effect, and no evidence consistent with a pure selection model.”

In the last decade, researchers have examined other consequences of gang membership, aside from offending, in various new domains (education, family, employment); while considering the longer term impact during early adulthood in addition to the immediate consequences during adolescence. Indeed, we have seen a number of studies indicating the gang’s impact on drug use, fear of crime, victimization, attitudes to offending, teenage parenthood, educational achievement, and success in the labor market (Barnes et al. 2010; Barnes, Boutwell, and Fox 2011; DeLisi et al. 2009; Gibson et al. 2012; Katz et al. 2011; Melde, Taylor, and Esbensen 2009; Ozer and Engel 2012; Pyrooz and Decker 2011; Thornberry et al. 2002).

Some researchers are now assessing the direct and indirect impact of past gang membership on parenting attributes and on gang members’ own

children (Augustyn, Thornberry, and Krohn 2011). Their emerging findings suggest that even transient gang membership can cast a long shadow in a variety of developmental domains. These findings are being used to justify the need to prevent gang membership not just from a public safety perspective but also from a public health and social perspective.

Explaining the Impact of Gangs

Until recently much of this research has taken a “black box” approach to explaining how gang membership impacts development. Historically, researchers favored, but did not formally test, a social learning approach to explain the link between gang membership and offending (Thornberry et al. 1993; Winfree, Mays, and Vigil-Backstrom 1994), with gangs being conceptualized as sites for learning delinquent behavioral repertoires, techniques of neutralization, and delinquency values. This would be consistent with research on “deviance training” within the broader area of peer effects on offending (Dishion et al. 1996; Patterson, Dishion, and Yoerger 2001; Snyder et al. 2005).¹

More recently, however, we have witnessed attempts to explain the impact of gangs have on developmental outcomes through a broader theoretical lens. The most significant contribution in this field has been the work by Melde and Esbensen (2011a, 2011b, 2012). These authors conceptualize gang membership as an “acute” turning point (Sampson and Laub 2005). This is similar to Moffit’s (1993) notion of “snares”: child or adolescent experiences that diminish the probability of a conventional lifestyle by eliminating opportunities such as lucrative jobs, higher education, or attracting a prosocial supportive spouse. For Melde and Esbensen (2011a) gang affiliation may lead to (1) a weakening of social bonds to conventional institutions, (2) the development, learning, and/or strengthening of deviant self-concepts, values, and what they call *anger identity*, and (3) a change in routine activities; all of which will have an impact on offending and other developmental outcomes. Thus, although their work does not discount the relevance of value transmission and cognitive transformations within gangs, they also emphasize how gangs may contribute to detachment from conventional institutions (as more generally shown by Kreager, Rulison, and Moody 2011 regarding delinquent peer groups) and the importance of routine activities (Osgood et al. 1996). They report results that are supportive of these processes.

Other scholars (Matsuda, Chris Melde, et al. 2012) link concerns with gangs as sites for social learning with Anderson’s (1999) ideas on the code

of the street. They argue that gangs facilitate the adoption of values and emotions that are consistent with the code and that this, in turn, mediates the link between gangs and violent offending. The learning that takes place within these social networks through gang embeddedness may indeed be associated with processes of cognitive transformation and identity formation (Sweeten, Pyrooz, and Piquero 2012), which at least sometimes can be deliberately sought after (Felson 2006). The focus here is on the contribution of gang membership to social identity and associated behavioral and cognitive implications (Hennigan and Spanovic 2012) as well as on the group processes that facilitate this (Short and Strodtbeck 1965). As Vigil (1988:421) puts it: “the gang norms help shape what a person thinks about himself and others and provides models for how to look and act.”

Another less explored possibility is that labeling and stigmatization might also play a role. According to this view, young people become more deviant by joining the gang, but they may also be seen as more deviant and treated as such, which in turn—as labeling theory would argue—reinforces both the mechanisms of deviant identity development and the social exclusion of these young people. For example, Decker and Van Winkle (1996:24) argued that gang membership increases isolation from mainstream institutions and this prevents gang members from “engaging in the very activities and relationships that may reintegrate them into legitimate roles.” For Decker and Van Winkle, this isolation results from the activities of legitimate social institutions that distance themselves from gang members as a consequence of the perceived threat they represent. The criminal justice system itself may also reinforce criminal embeddedness in deviant criminal networks and strengthen these processes (Bernburg, Krohn, and Rivera 2006; Huizinga and Henry 2008; McAra and McVie 2006; Ralphs, Medina, and Aldridge 2009). A recent review of the gang literature indeed concluded there was a need to pay more attention to labeling theory and symbolic interactionism for explaining the consequences of gang membership (Decker, Melde, and Pyrooz 2012).

The Need for Comparative Research

Impressive as this body of literature is, there are still significant gaps in our knowledge. Almost all of this research has been carried out with North American samples. The gang, as a sociological concept and policy tool informing interventions with youth, has been primarily constructed and deployed in the United States, and as a result little comparative work has been undertaken (Klein 2011). In Europe in particular, there has been a

historical reluctance to study youth offending using the concept of gangs as a heuristic tool.

This is, however, changing as different European nations are coming to recognize that they face what is increasingly being accepted by policy-makers, practitioners, and the public as a “gang problem.” Comparative research is beginning to illustrate considerable similarities alongside differences, across U.S. and European gangs (Decker and Weerman 2005).

These studies provide evidence of prevalence levels of gangs in Europe that are not dissimilar from those encountered in the United States when using similar study designs and definitions as well as a considerable degree of consistency in terms of the risk factors associated with gang membership (Gatti, Haymoz, and Schadee 2011; Sharp, Aldridge, and Medina 2006). Although there are important differences in terms of racial segregation (Finney and Simpson 2009) and spatial polarization of poverty (Wacquant 2008) between Europe and the United States, links nevertheless remain between gang formation and geographies of social exclusion and marginalization that are often intertwined with processes of migration and integration of ethnic, regional, and/or religious minorities (van Gemert, Peterson, and Lien 2008).

Some notable differences are also evident. In particular, European gangs exhibit a level of violence that, although high in their respective national contexts, is still considerably lower and less lethal than that of U.S. gangs (Hopkins, Tilley, and Gibson 2012; Klein, Weerman, and Thornberry 2006). Equally, attributes of gang culture and gang institutionalization (recognized leaders, symbols, initiation rituals, and specific rules or codes) still seem rarer among European gangs (Winfree et al. 2007). Along these lines, some research also suggests a lower prevalence of traditional and neotraditional gangs, particularly with multigenerational links (Klein et al. 2006; Rostami, Leinfelt, and Holgersson 2012).

Regarding the impact of membership, a number of cross-sectional analyses have illustrated the same relationship between gangs and offending encountered by the U.S. and Canadian researchers (Bradshaw 2005; Gatti et al. 2011; Sharp et al. 2006). But we still lack research that matches the scope and analytical sophistication of the best North American longitudinal studies of the impact of gang membership on personal development (exceptionally, Bendixen, Endresen, and Olweus 2006).

This Study

In this study, we used data from a nationally representative survey of children and young people in England and Wales to assess the impact of

gang membership on a number of negative developmental outcomes and compared our results with findings reported in the United States. In particular, we took advantage of the longitudinal nature of this survey to explore the impact of onset of gang membership through the use of a propensity score analysis framework. We also examine the impact of gang membership on factors that have been identified by U.S. research as mediators of the impact of gang membership on problem behavior.

We focus on assessing the impact of gang membership on a variety of more traditional “criminological” outcomes such as offending, antisocial behavior, and drug use, as well as a number of measures that mirrored Melde and Esbensen’s (2011a) operational definitions of “mediating processes” between gang membership and problem behavior. Specifically, we assessed the impact of gang membership on victimization, fear of crime, peer socializing, routine activities, commitment to deviant peers, and neutralization techniques. Because a labeling perspective suggests that gang membership reinforces processes of self-isolation and imposed social exclusion from conventional institutions, we examined the link between gang affiliation and unwanted police contacts.

Data

The Offending Crime and Justice Survey (OCJS) was a government-sponsored longitudinal panel survey containing nationally representative data on young people’s victimization and self-reported offending. The survey, which employed a multistage stratified random sample design, was first undertaken in 2003, when people aged 10 to 65 years living in private households in England and Wales were interviewed. The survey was repeated annually until 2006, but from 2004 focused only on people aged 10 to 25. Interviews were conducted face to face, but also included a self-completion computer-assisted component to record problem behavior. From 2004 onward, the survey asked questions about gang membership to respondents who were 10 to 19 in each wave (Sharp et al. 2006).

The OCJS contained a “rotating panel”: in each subsequent year, the previous year’s sample was reinterviewed and augmented by a further “fresh” sample to ensure a cross-sectionally representative sample of young people. Response rates for the panel sample varied between a low of 82 percent in 2004 and a high of 86 percent in 2006. Here we limit the analysis to the panel respondents that were followed from 2003 onward, focusing on respondents who (1) had participated in all the four waves (this is the only sample with publicly available weights) and who (2) were aged

Table 1. Descriptive Statistics for Outcomes.

	Gang Members (Onset During 2005)		Nongang Members (as of 2005)	
	2005	2006	2005	2006
Count of offending	6.00	4.44	1.06	1.05
Antisocial behavior	4.41	5.02	1.29	1.32
Drug use	0.35	0.36	0.12	0.14
Fear of crime	1.08	1.04	1.18	1.07
Injurious victimization	0.20	0.11	0.07	0.07
Moral neutralization	1.10	1.15	0.88	0.87
Commitment to deviant peers	1.22	1.18	0.84	0.85
Frequent peer socializing	0.48	0.35	0.27	0.24
Hanging out in street	0.71	0.56	0.34	0.27
Police trust	0.71	0.63	0.79	0.78
Unwanted police contact	NA	0.44	NA	0.19

10 to 16 at the time of the first wave (2003), since the gang membership questions (as well as many others) would be missing in subsequent waves for those aged over 16 in 2003. Our focus is on those who became gang members during 2005 compared to nongang members. These selection criteria resulted in a final sample of 1,214 young people.

Measures

Table 1 provides basic descriptive statistics for gang membership as well as all the outcome variables we employ for two groups of interest for our analysis.

Gang Membership. Most gang researchers consider the self-nomination approach (i.e., “are you a gang member?”) a robust method in the U.S. context. However, most European languages do not have an equivalent term with the same dense set of culturally specific connotations. This is true even in the United Kingdom where survey research has suggested that many young people still use the term to refer simply to their informal peer group (Hayden 2008; Medina et al. 2013).

Thus, we employed a variation of the Eurogang network measures for this study. The Eurogang network, a working group of the European Society of Criminology, defines gangs as *any durable, street-oriented youth group whose identity includes involvement in illegal activity*. The network also

proposes an alternative approach to measuring membership that moves away from self-nomination. This approach classifies as gang members respondents who answer in a particular manner a number of survey questions (for more details, see Weerman et al. 2009). It is expected that the respondents will state:

- having a stable groups of friends (for the last 3 months or more),
- that is composed primarily of young people (mostly under 25),
- who spends a lot of time together in public places,
- and that *their group* (as such) *both* accepts *and* engages in illegal behavior.

This measure has now been used in over 30 countries (Gatti et al. 2011). The OCJS asked these questions to all 10- to 19-year-olds in 2004, 2005, and 2006. Although U.S. research suggests a less than perfect correlation between the Eurogang measure and the self-nomination measure (Matsuda, Esbensen, and Carson 2012), it also suggests a high degree of construct validity (by means of association with key risk factors and developmental outcomes). Melde and Esbensen (2012) have replicated their original results regarding the consequences of gang membership using this operationalization with an American sample. A recent U.K. study using a latent class analysis approach has also shown that the Eurogang criteria do a good job of discriminating among respondents who belong to delinquent youth groups, as opposed to other prosocial youth formations (Medina et al. 2013).

For the analysis reported here, we used a variation of the Eurogang operationalization. First, we excluded the question about acceptance of illegal behavior by the group (*Is doing illegal things seen as being OK by your group?*) because cognitive testing suggested unclear understanding of its meaning by the intended sample. Subsequent analysis uncovered a much higher percentage of missing data for this question than any of the other gang definers, reinforcing the possibility that the question was not properly understood by many respondents. Second, we “widen the net” using additional markers to measure the behavioral element of the definition. The Eurogang model asks whether “people in the group do illegal things together,” but the OCJS questionnaire also includes specific examples of illegal things members of the group may have done together (use of force against persons, robbery, drug sales, etc.). We counted as gang members individuals who indicated that their groups were involved in any of these activities (even if they said “no” to the more general Eurogang question about group involvement in illegal behavior). However, we excluded those

young people whose only illegal activity was to take drugs together (for a rationale, see the arguments developed by Aldridge, Medina-Ariza, and Ralphs 2012; and Medina et al. 2013).

Using this definition results in a sample of 90 young people who became gang members in 2005 versus 1,124 young people who were not gang members during 2005 or before. Despite differences in context and measurement these numbers are very similar to those reported by Melde and Esbensen (2011a): 69 gang members versus 1,275 nongang members.

Problem Behavior: Offending, Antisocial Behavior, and Drug Use. Our analysis focused on a variety of potential outcomes of gang membership. Unless indicated all measures were available in 2005 and 2006. Offending was measured using a count of offences committed in the previous 12 months. These measures include 16 items on property offences (criminal damage, vehicle theft, robbery, burglary, etc.), 2 items on violence (assault with or without injury) and drug-related offending (selling of different type of substances). The offences considered are not too dissimilar from those included in the well-known Elliot scale of delinquency.

The OCJS also used measures of nuisance (*antisocial*) behavior or incivilities (being noisy or rude in public places, graffiti, public transport fare evasion, and complaints from neighbors). For each of these items, the respondents had to indicate in an ordinal scale (1 or 2, 3 to 4, 5 to 10, more than 10) how often these things happened in the previous year. We weighted the frequencies (by taking the midpoint of each ordinal response) and added the responses across the 4 items.

Respondents were asked whether they had *ever* taken any of nine illegal substances in their life (ranging from solvents to heroin and crack). If they answer positively to the “ever” question, then they were also asked whether they had taken the same substance in the previous 12 months. For this analysis, we used a derived measure that assesses whether the respondents had taken any of these substances in the previous 12 months.

Fear and Injurious Victimization. Melde et al. (2009) reported that gang membership reduces fear of crime, although it increases perceptions of risk and levels of victimization. For them, this is consistent with socialization into a macho violent culture that expects and values displays of fearlessness as means for gaining respect from similarly situated peers. The OCJS includes 3 items that asked respondents how worried they were about particular criminal events happening to them. These included their homes being broken into and having something stolen, being mugged, and being

physically attacked by strangers. The responses ranged from *very worried* to *not at all worried* on a 4-point ordinal scale. We calculated an average across these 3 items as our index score of fear of crime. High scores in this scale represent higher levels of fear. The Cronbach's α for this scale was very good at .86.

The OCJS asked respondents how many times someone has used force against them. If they reported one or more instances of victimization, they were then asked a follow-up question about whether they had suffered an injury as a result. We used this binary indicator to assess the impact of gang membership on serious victimization.

Moral Neutralizations. As indicated in the introduction, a number of authors have argued that the impact of gangs on offending is mediated by the learning of deviant values that take place in these groups. To validate this notion, we tested the impact of gang membership on moral neutralizations. This measure is based on responses to 4 items that asked whether it was ok to engage in certain illegal behavior in various situations: Steal something if you are very poor, steal something from somebody rich who can afford to replace it, steal from a shop that makes a lot of money, or sometimes to break the law. The response options ranged from *strongly agree* to *strongly disagree* on a 5-point Likert-type scale. The index score resulted from averaging the responses across the 4 items. High scores in this scale represent high level of neutralizations. The Cronbach's α was a very acceptable .76.

Peers and Routine Activities. The group processes implied in gang membership may also produce a change on the nature of peer interactions and routine activities. We used several measures to examine this possibility. Peer socializing was defined by how often respondents saw their friends during the evenings or at weekends (ranging from *less than once a month* to *six or more times a week*). Previous analyses with these data have demonstrated a nonlinear effect of peer socializing (Medina 2013); therefore, we collapsed this measure into two categories: individuals with very frequent peer socializing (six or more times a week) versus individuals with less common peer socializing. We also used a dichotomous measure that indexes whether respondents tend to socialize with their peers in the street or other public places in the area where they live.

In order to measure commitment to deviant peers, we used the responses to 2 items that asked participants if they would still hang out with their friends if doing so would, respectively, get them in trouble at home or with the police. The 4-point ordinal responses (from *definitely not* to *definitely*

yes) were summed and averaged across the 2 items. High scores represent higher commitment. The Cronbach's α is a very acceptable .77.

Trust in Local Police and Unwanted Police Contact. Finally, we were interested in assessing the impact gang participation produced on relationships with the police. The OCJS asked respondents to indicate how much they trusted the local police on a 4-point scale from *a lot* to *not at all*. To avoid sparseness, we collapsed responses into two groups (those who trusted the police a fair amount or a lot vs. those reporting less trust). In addition, we derived a variable to measure unwanted police contact combining responses regarding three different types of police contact (stop and frisk, stop, being asked to move by the police). These questions about unwanted police contact were only available in the last wave of the OCJS.

Analytic Strategy

Extensive research has documented that not all young people exhibit the same risk of joining a gang (Decker et al. 2012; Klein and Maxson 2006) and, as highlighted above, we know that to some degree there is an element of self-selection of individuals with stronger criminal propensities into this type of group (Krohn and Thornberry 2008). To address this endogeneity, we relied on propensity score techniques that aim to replicate as closely as possible a randomized experiment by means of obtaining treated and control groups with similar characteristics (Caliendo and Kopeinig 2008; Gibson et al. 2012; Guo and Fraser 2010; Stuart 2010).

There are a variety of approaches both for estimating propensity scores and their subsequent use for estimating effects. But results should converge with large samples regardless of the approach followed (Caliendo and Kopeinig 2008). Nonetheless, the literature suggests attempting several approaches to ensure robustness of findings.

Given the presence of covariates with missing data, we estimated propensity scores using generalized boosted regression (abbreviated as GBM), a machine learning technique that can handle missing data. We also used the estimated scores in two different ways matching on nearest neighbors and using the scores in a way equivalent to sampling weights. Within these balancing procedures, we also experimented with different specifications (e.g., using a different stopping method in GBM). It is not feasible to describe all of our analysis and results here (they can be provided upon request); thus, we focus our description here on those models that weighted the observations using these scores as implemented in the *R* package *twang*

(Ridgeway et al. 2012). Nevertheless, the general pattern of findings *did not change* in substantive manner regardless of the matching approach employed to construct the counterfactual.

Propensity score weighting is an approach that reweights “treatment” and “control” groups, so that their covariate distribution match. Once the probability of treatment is estimated, the procedure assigns weights of 1 to the treatment group and the inverse probability weight to the control group cases. This approach gives a greater weight to nongang members who have a distribution of observed covariates similar to that of the gang members. After weighting, the difference between the average outcome for the treatment group and the weighted outcome of the control group provides an estimate for the average treatment effect on the treated. As other propensity score weighting methods, this approach offers a good compromise between reduction on bias and variance in the estimated effect (Ridgeway et al. 2012; Stuart 2010).

Propensity score analysis makes a “strong ignorability assumption”: The model must have the correct functional form and include all factors associated with gang membership and the outcomes of interest. Failing to do this will introduce bias in the estimation. Furthermore, the correct specification of the model estimating the propensity scores is particularly important when using them as inverse probability weights (Caliendo and Kopeinig 2008; Guo and Fraser 2010). This literature notes that including variables only related to treatment “usually reduces bias more than it will increase variance” (Ho et al. 2007:216). Accordingly, the 28 “pre-treatment” variables we selected for estimating the propensity scores met several criteria: (1) they have been identified or investigated in the literature (see Klein and Maxson 2006) or this sample (Sharp et al. 2006) as risk factors for gang joining (2) were measured prior to gang joining (see Table 2 for all variables included), (3) and their univariate test had a p value $< .25$ (Hosmer and Lemeshow 2000). Most of the variables selected revealed, in fact, univariate significant differences ($\alpha: .05$) between gang joiners and nongang members. The existence of this imbalanced covariate distribution highlights the need to adjust for these differences.

Typically, propensity scores are estimated with logistic regression. An alternative increasingly considered more appropriate is GBM models (Ridgeway 2007). Although GBM has traditionally been used in forecasting, it has also been adapted to satisfy the need of propensity score estimation to produce solutions that maximize covariate balance (for a detailed discussion of these methods: McCaffrey, Ridgeway, and Morral 2004; Ridgeway et al. 2012). This technique presents a number of advantages. It can

Table 2. Balance between Treatment and Control Group in Pretreatment Covariates (After Weighting) and Relative Influence in General Boosted Model (Best Iteration).

	$E(Y t = 1)$	$E(Y t = 1)$	KS	$E(Y t = 0)$	R Influence
Age	12.56	12.57	0.05	12.88	6.38
Lives in owned property	0.70	0.70	0.00	0.79	0.38
NA	0.00	0.00	0.00	0.00	
Family financially managing well	0.59	0.56	0.03	0.67	2.64
NA	0.00	0.02	0.02	0.02	
Not much or nothing in local area	0.76	0.68	0.07	0.61	1.04
NA	0.00	0.00	0.00	0.01	
Ten or more friends live in local area	0.54	0.56	0.02	0.38	2.47
NA	0.00	0.00	0.00	0.00	
Trust the police: <i>not very much or not at all</i>	0.23	0.21	0.02	0.16	3.27
NA	0.02	0.04	0.01	0.02	
Variety score of incivilities in local area	1.36	1.31	0.04	1.16	0.80
NA	0.00	0.00	0.00	0.00	
Hangs around in street with friends (yes)	0.67	0.65	0.02	0.34	5.82
NA	0.01	0.02	0.01	0.04	
Ever truant from school (yes)	0.21	0.18	0.04	0.07	5.06
NA	0.00	0.01	0.01	0.01	
Number of times in trouble with teachers	2.75	2.65	0.04	1.84	14.09
NA	0.02	0.02	0.00	0.03	
Did not like school	0.28	0.22	0.06	0.11	3.02
NA	0.00	0.00	0.00	0.02	
Brought up from both natural parents (yes)	0.54	0.60	0.05	0.68	1.42
NA	0.00	0.00	0.00	0.00	
Time spent with parents: <i>All or most of my time</i>	0.34	0.37	0.02	0.46	1.39
NA	0.03	0.04	0.01	0.14	
Cares about what parents think: <i>not or only a little</i>	0.32	0.32	0.00	0.17	2.53
NA	0.03	0.04	0.01	0.14	

(continued)

Table 2. (continued)

	$E(Y t = 1)$	$E(Y t = 1)$	KS	$E(Y t = 0)$	R Influence
Parents usually listen to me (no)	0.11	0.07	0.04	0.05	1.18
NA	0.03	0.03	0.01	0.03	
How often do fun things with family: <i>Less than weekly</i>	0.76	0.75	0.01	0.58	3.04
NA	0.03	0.05	0.02	0.15	
Guardians know peers: <i>Yes, all of them</i>	0.40	0.38	0.02	0.45	0.75
NA	0.00	0.00	0.00	0.00	
Delinquent peers: <i>yes</i>	0.34	0.32	0.02	0.16	2.00
NA	0.00	0.01	0.01	0.01	
Commitment to deviant peers	3.00	3.06	0.05	3.21	4.45
NA	0.06	0.08	0.03	0.07	
Meets peers in evenings: <i>six times (+)</i>	0.50	0.48	0.02	0.24	5.54
NA	0.00	0.01	0.01	0.02	
Usually do what I'm told: <i>No</i>	0.86	0.79	0.07	0.59	1.47
NA	0.00	0.00	0.00	0.00	
Usually bored and hard to focus: <i>Yes</i>	0.32	0.30	0.03	0.20	0.62
NA	0.00	0.00	0.00	0.00	
Moral neutralizations	4.06	4.10	0.08	4.23	6.41
NA	0.00	0.00	0.00	0.00	
Ever arrested: <i>Yes</i>	0.09	0.08	0.01	0.04	2.44
NA	0.00	0.01	0.01	0.01	
Count of offending	2.67	2.25	0.07	1.16	12.29
NA	0.01	0.01	0.00	0.01	
Antisocial behavior	2.15	1.72	0.06	1.02	3.30
Count of violent victimization	1.11	0.96	0.03	0.61	4.93
NA	0.00	0.01	0.01	0.01	
Injurious victimization: <i>Yes</i>	0.18	0.17	0.01	0.09	1.17

Note: KS: Kolmogorov–Smirnov statistic.

Only one level and missing data shown for each of the categorical input.

handle large numbers of covariates (even in presence of collinearity) and missing data without having to rely on multiple imputations, while also allowing for flexible, nonlinear relationships between covariates and the outcome (McCaffrey et al. 2004).² In fitting these models, we followed the general guidelines set out by the literature (McCaffrey et al. 2004; Ridgeway 2007).³ We discuss diagnostics for balance and sensitivity in the Results section.

Our models for estimating the effect of gang membership effectively contrast respondents who were classified as gang members for the first time in 2005⁴ (gang joiners) with those who were not gang members in 2005 or 2004 (nongang members). We assess differences in outcomes as measured in 2005 and in 2006 and, thus, focus on proximal outcomes. Gang membership reflects status at moment of survey administration (2005) but could have started at any point in the previous 12 months, whereas questions on problem behavior and other outcomes (i.e., victimization) relate to events taking place during the previous 12 months. This makes it impossible to establish whether some of this problem behavior took place before or after joining a gang during 2005. Differences in problem behavior as reflected in the 2006 survey, therefore represent a more solid test of the impact of joining a gang in 2005, insofar as the temporal order allow us to more clearly interpret them as a *consequence* of gang membership as measured in 2005.⁵

Results

Estimation and Diagnosis of the Propensity Scores

Figure 1 shows the distribution of propensity score for gang members and nongang members using the Kolmogorov–Smirnov test as a stopping rule in the boosted regression model.⁶ As it would be expected, the gang group has high propensity scores. We can also observe that a small number of nongang members also have high propensity scores, but most have scores of less than 0.10. Although ideally one wants greater overlap between the two groups, there seems to be a sufficient number of comparisons. The degree of overlap observed here leads to (a) small weights for most of those observations and (b) a reduction in sample size. None of the derived weights are excessive, with very few youths exceeding weights of 1 or 1.5. After weighting, the gang group still includes 90 individuals, but the effective sample size of the comparison group reduces from 1,124 to 228. In other words, about 80 percent of the nongang members present a distribution of observed covariates that makes them noncomparable to the gang group.

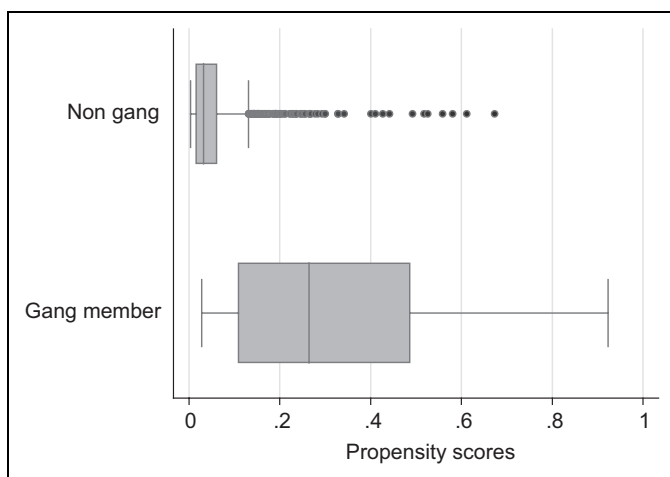


Figure 1. Boxplot of the propensity scores across gang membership status.

The weighting basically filters them out. Although this may seem like a large number of cases to lose, the advantage of propensity score balancing over covariate adjustment via regression is that it allows us to exclude these *noncomparable* individuals when estimating effects.

Our results suggest we were successful in obtaining covariate balance. After applying weights derived from the GBM, differences between groups diminished notably, with the average absolute effect size dropping 79 percent to .06. No pretreatment variable has an effect size over .2. Table 2 shows in the first columns the treatment and control values after and before weighting, as well as the Kolmogorov–Smirnov test statistic.

We can also observe covariate balance visually in Figure 2. This figure shows the QQ-plots comparing the quantiles of the p values before and after weighting to the quantiles of the uniform distribution (p values from independent tests in which the null hypothesis is true have such a uniform distribution). Before weighting many variables have significant differences between groups, but after weighting this no longer is the case and the p values follow the cumulative distribution of a uniform variable. Essentially, the figure illustrates that after weighting, differences in the observed covariates are close to those we would expect under randomization.

Table 2 also provides the relative influence of each variable for estimating the probability of gang membership based on the model that offered the best covariate balance using the Kolmogorov–Smirnov test. In a linear

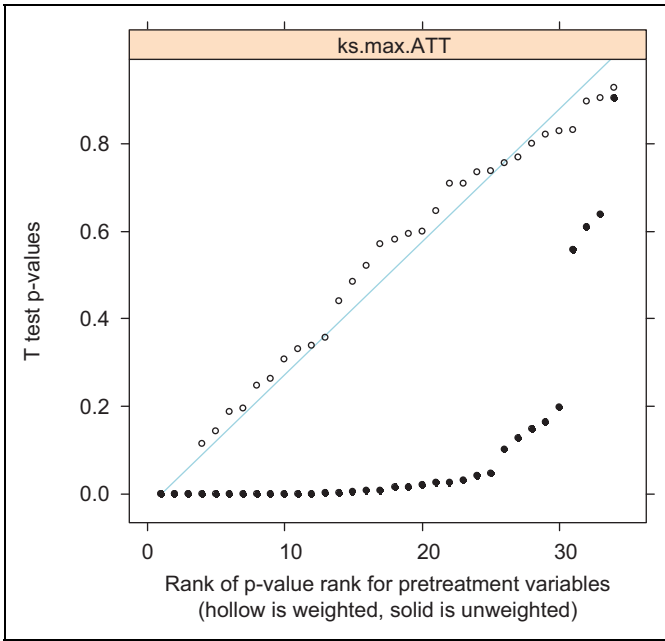


Figure 2. QQ plot to assess covariate balance.

regression model, the effect of the covariates on the outcome is summarized by the β coefficients. In boosting, instead of using these coefficients, we use a measure of “influence of variables” that is invariant to the scale of measurement. In non-Gaussian models, like the one we fitted, this value provides the reduction attributable to each variable in sum of squared error in predicting the gradient on each iteration of the regression tree model. Because the tree does not separate main effects and interactions, influence measures are only provided for variables; therefore, they tell us nothing about how the variables affect the outcome (this can be achieved through more detailed visual analysis: Schonlau 2005). Although explaining gang onset is not the main focus of our article, given the relative paucity of risk factor research on gang onset outside the United States and the more general lack of a precise understanding of the *hierarchy* (Decker et al. 2012) of these risk factors, we provide a short nondetailed discussion of these results.

Results suggest the two most influential variables predicting gang membership are both indicators of past problem behaviors: the number of times the respondent got in trouble with their teachers and the count of offending

during 2004. Both have a relative influence at least twice as large, as any of the other pretreatment covariates. Next on the ranking of relative influence are variables that measure nature of previous peer interactions and routine activities (frequency of peer socializing, hanging out in the local area, commitment to deviant peers), age (which, although not evident in these results, we know has a curvilinear relationship to gang membership), moral neutralizations, and other indicators of problem behavior (truancy from school, antisocial behavior). We also observe that frequency of previous victimization plays a nontrivial role in predicting the onset of gang membership. Less relevant are variables that measure other individual attitudes, family, and community background. Although these are the results of a boosted regression model aimed at maximizing *covariate balance*, the results are in line with those we find when we run boosted models aimed at maximizing *forecasting*.

Estimating the Effects of Gang Membership

In order to perform the outcome analyses, methods were used which take into account the inverse probability weights when computing the standard error estimates. We used the estimating functions programmed into the *R* package *survey* (Lumley 2010) as discussed by Ridgeway et al. (2012) and the appropriate general linear model (Gaussian, quasi-Poisson, and quasi-binomial: see Lumley 2010) for each type of outcome. Table 3 provides the results from these models. The *p* values were adjusted to control for the false discovery rate when conducting multiple tests using methods described by Benjamini and Hochberg (1995).

Moreover, to more accurately estimate the effect of gang membership on unwanted police contact we used a “double robust” estimation procedure (Bang and Robins 2005) and, so, also adjust for offending during the previous 12 months, extent of peer socialization and hanging out in the street—all factors that have been identified as correlated to the likelihood of police contact (Medina 2013). Table 3, however, only displays the results for the key covariate of interest, gang onset.

Our results suggest a clear contemporaneous and lagged effect of gang onset on problem behavior. When compared with nongang youth, respondents who joined a gang during 2005 reported increased levels of offending and antisocial behavior during 2005 and 2006. Equally, the proportion of respondents who declared use of drugs during 2005 and 2006 is greater among gang members. We can also observe a greater vulnerability to injurious victimization for the gang members during 2005, although this

Table 3. Estimating the Effect of Gang Membership Onset.

	β Coefficient	T value	Pr(> t)
Time 3 (2005)			
Count of offending	1.21	3.71	0.001
Antisocial behavior	1.08	5.99	0.000
Drug use	0.74	2.52	0.025
Fear of crime	0.07	0.84	0.468
Injurious victimization	0.99	2.97	0.010
Moral neutralization	0.13	1.57	0.168
Commitment to deviant peers	0.27	2.81	0.011
Frequent peer socializing	0.23	0.91	0.449
Hanging out in street	0.78	2.93	0.010
Police trust	-0.07	-0.252	0.841
Time 4 (2006)			
Frequency of offending	1.30	3.62	0.002
Antisocial behavior	1.04	5.06	0.000
Drug use	0.87	3.12	0.007
Fear of crime	-0.01	-0.17	0.864
Injurious victimization	0.40	1.06	0.378
Moral neutralization	0.18	2.34	0.036
Commitment to deviant peers	0.23	2.32	0.036
Frequent peer socializing	0.09	0.34	0.813
Hanging out in street	0.59	2.28	0.037
Police trust	-0.40	-1.55	0.168
Unwanted police contact	0.87	2.82	0.012

Note: Offending and antisocial behavior represent counts. Moral values, fear of crime, and commitment to deviant peers are composite scores. Drug use, frequent peer socializing, hanging out in the street, police trust, unwanted police contact, and injurious victimization are binomial categorical outcomes.

difference does not achieve statistical significance in 2006. Given potential problems with temporal order and the fact, noted above, that victimization is also influential in predicting gang membership, we have to be cautious in our interpretation of this finding.

When we examine changes induced in other outcomes that could help explain an increased level of problem behavior, we find that gang membership appears to impact on commitment to deviant peers and routine activities (as indexed by the binary variable measuring “hanging out” in the street) both in 2005 and in 2006, and a lagged effect on ascription to neutralization techniques in 2006 (but not in 2005). Our results also suggest that gang membership increases the probability of unwanted police contact.

We failed however, to observe significant differences regarding frequency of peer socialization, fear of crime, or trust in the local police (although for the most part differences are in the hypothesized direction).

Sensitivity Analysis

Any propensity score analysis relies on the assumption that the model estimating the scores successfully eliminates selection bias. Our use of weighting cannot adjust for unobserved variables that are uncorrelated with the observed ones. Ozer and Engel (2012), for example, used this argument to question some of the results of studies assessing the link between gang membership and victimization. They flag, in particular, the need to incorporate in the propensity score models not only individual level inputs but also measures of the ecological context inhabited by young people. This, however, is easier said than done. The poor record of measures of neighborhood characteristics in models predicting gang membership (Klein and Maxson 2006) is probably more a reflection of the quality of data, and type of analysis attempted, rather than related to poor theorizing. In our case, the OCJS has few suitable measures (deciles of social deprivation and antisocial behavior in the community), with only the latter being in some way related to gang membership (as noted above).

Presence of hidden bias, however, is not a problem exclusive to gang studies. The literature on propensity score analysis discusses a number of sensitivity analyses that have been developed to evaluate the plausibility of the ignorable treatment assignment assumption. These methods allow examination of how the treatment effect may change if there is hidden bias. Here, we used methods described by Ridgeway (2006) and implemented in the *R* package *twang*. These methods test the sensitivity of the estimates to changes in the propensity score weights as a way to detect such hidden bias (for a detailed discussion, see Ridgeway 2006).

Analyses were performed for each of the outcomes previously identified as significant. Given the large number of outcomes, it would be impractical to incorporate the full detail of these results which amount to 13 tables with as many rows as there are inputs in the boosted regression model (these tables are available on request). However, inspection of these results indicates that hidden bias is unlikely to be a serious issue affecting our results.

Discussion and Conclusion

This study aimed to examine the impact of gang joining with data from a nationally representative survey of young people in England and Wales.

The main goal was to ascertain the degree to which patterns that have been observed in a large number of North American studies can be replicated in the European context.

Like most studies to date, our analyses found a clear effect of gang membership on offending and other forms of problem behavior, such as antisocial behavior and drug use. Children and young people who join gangs seem more likely to exhibit these forms of problem behavior shortly after joining a gang and within a year of joining. Unlike Melde and Esbensen (2011a), we find a lagged effect for gang affiliation on offending, although measurement problems in both studies make it difficult to say how distal that effect really is (cf. Gibson et al. 2012). Our results, however, failed to find clear, consistent moderate-to-strong effects for fear of crime or victimization.

When explaining the mechanisms that mediate the influence of peer effects on delinquency, there seem to be two primary “competing” models that have typically dominated discussion:

- The social learning model that emphasizes “deviance training” (Dishion et al. 1996; Patterson et al. 2001; Snyder et al. 2005) which, as noted in the Introduction, has historically been the usual model implied or explicitly employed in gang studies.
- The routine activity model that emphasizes how peer interactions change opportunities for crime involvement by placing young people in contexts of diminished social control (Hailey and Osgood 2005; Osgood et al. 1996; Rorie et al. 2011), but also (to the degree that gangs may define themselves as groups in opposition to other aggregates) by providing gang members with a set of preestablished antipathies, enemies, and conflicts that may exacerbate interpersonal conflict and violence (Hartup 2005). Some of this has been incorporated more recently into gang studies through the work of Melde and Esbensen (2011a) and others (Sweeten et al. 2012).

Our analysis does not directly test the mediation mechanisms that explain the link between gang membership and this problem behavior; all we can establish is whether gang membership onset in 2005 also was associated with indicators of these mediation mechanisms in 2005 and 2006. In neither case, can we disentangle the temporal order between the hypothetical mediation variables and the ultimate outcomes of interest (i.e., problem behavior). However, our results here are a first step in that direction and are perhaps more in line with a routine activity framework. Our analysis failed

to find a significant effect of gang membership on moral neutralizations in 2005 (only in 2006) or, for that matter, on trust in local police (which could also be explained as a culturally infused variable and part of an oppositional subculture: Oberwittler 2012); whereas we found a more consistent effect (in 2005 and 2006) for an increased commitment to deviant peers and an increased prevalence of hanging out in the street (although not for increased peer socializing).

We should, however, be cautious in our interpretation of the findings. The power of our tests is not large enough to detect particularly small effects. Although our study has similar, or better, power (at least as far as sample size is concerned) as other published studies assessing the impact of gang membership (Melde and Esbensen 2011a; Ozer and Engel 2012), the possibility remains that with a larger sample we might obtain different results.

We also identified an effect of gang membership on unwanted police contact, even after adding additional adjustments for offending and routine activities through a double robust estimation procedure. This finding is consistent with research suggesting the idea of “policing by association”: that police working rules mean officers pay greater attention to those who associate with delinquent friends to some degree *regardless of their individual level of offending* (McAra and McVie 2006; Medina 2013). As argued by McAra and McVie (2006:26): “Once youngsters come under the purview of the police, they then become part of the permanent suspect population and, as a consequence, any of their friends and associates who have not had past experience of adversarial police contact, become suspect too. This cycle of labeling contributes to further and indeed more serious forms of contact.” The finding reinforces the need to pay close attention to symbolic interactionism as a theoretical framework to understand gang membership and its consequences (Decker et al. 2012; Ralphs et al. 2009).

Taken together, our findings on the impact of gangs and the risk factors for gang membership are supportive of an enhancement model as discussed in the literature (Thornberry et al. 1993). Gangs do have a facilitating role on problem behavior once we control for selection effects. But, at the same time, our boosted regression model highlights the significant relative influence of past problem behavior on explaining onset of gang membership.

Equally, our results seem to provide some support to the idea that group processes trump other contextual factors (see as well Hall, Thornberry, and Lizotte 2006). Despite some differences, the general pattern of findings regarding the impact of gangs shows more similarities than differences with those reported by U.S.-based research. Although one might expect that

gangs will have a more attenuated effect in the British context given the cross-national differences in levels of inequality, spatial polarization of poverty, welfare regimes, gun availability, and violence, alongside lower levels of gang institutionalization.⁷ Yet, our findings suggest that for the most part gang's impact on problem behavior and other outcomes is not too dissimilar from that documented in American studies. This suggests that the gang, in the United Kingdom, is not just a site in which wider social inequalities drive offending and its myriad problematic outcomes, but instead that the gang itself is a driver of those outcomes, to an extent regardless of social context.

Apart from more directly testing the mediating mechanisms proposed in the literature, future European research should address other shortcomings of this study. First, greater attention needs to be devoted to developmental processes as they affect young people *and* gangs. The psychological literature highlights the changing nature and relevance of peer networks through adolescence. Some research has suggested that emphasis on individuality, as well as intimacy with romantic partners, increases as control, conformity, and concerns with belonging declines; and groups become less hierarchically structured around status and influence (Brown 2004). Emerging research suggests that the nature and characteristics of gangs do change as young people age (Medina et al. 2013) and that the relative relevance of socialization/selection processes in understanding the impact of peers on delinquency also changes with age (Hartup 2005; Monahan, Steinberg, and Cauffman 2009). Second, further prospective cross-national studies are needed in order to test adequately the influence of context on the processes studied both at the macro level and at the micro level (Klein 2011). For, as several studies have suggested, group characteristics (sex composition, organizational features, etc.) may also play a role in explaining the magnitude of the impact of gang membership (Decker et al. 2012). In this sense, there is also need for research that places a greater focus on group processes to understand the role they play in understanding the outcomes of gang membership. As several reviews have noted (e.g., Decker et al. 2012), despite early work (Short and Strodbeck 1965) we need more studies in this area. Gibson et al. (2012) have produced a more general and relevant list of suggested directions for future research on studying the impact of gang membership: a greater attention to the fluidity of gang membership over time, a greater focus on gang *embeddedness* rather than on gang *membership*, and a greater reliance on high-risk samples (see Sweeten et al. 2012 for a recent attempt at taking forward these recommendations). Finally, following the lead from the peer effects literature (Hartup 2005), we need

to move away from models that simply estimate the main effect of gang membership and focus instead on exploring how individual attributes of young people interact and moderate behavior changes associated with membership (i.e., previous delinquency, age, gender, susceptibility, etc.).

Future European research should address some of the shortcomings of this study and follow these recommendations. Unfortunately, the future of this sort of survey research on gangs (and more generally, youth offending) is uncertain, at least in the United Kingdom. The OCJS was discontinued in 2006; and cognate Youth Justice Board surveys also ceased in 2009. The only remaining opportunity to ask gang-relevant questions is in the Crime Survey of England and Wales (formerly the British Crime Survey), though this is with a relatively small subsample of roughly one thousand 10- to 15-year-olds, without a panel element, and using a rigid definition that does not allow for international comparisons. And so, despite the U.K. Coalition Government's rhetorical emphasis on evidence-based gang policy (Shute, Aldridge, & Medina 2012), we have, in fact, witnessed a major disinvestment in the production of high-quality research data that constitutes a major part of this evidence base.

Authors' Note

Points of view in this document are those of the authors and do not necessarily represent the official position of the Nuffield Foundation.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by the Nuffield Foundation, Grant Reference CPF/37749.01.

Notes

1. These studies explain the effects of early involvement with delinquent peers on subsequent delinquency as being mediated by the amount of deviancy training (i.e., reinforcement for deviant behavior, deviant talk with peers as well as observed peer responses to such behavior, etc.).
2. For other advantages, see Lee, Lessler, and Stuart (2010, 2011).
3. In particular, we estimated the models using 10,000 trees, subsampling 50 percent of the sample at each iteration (having first randomly sorted the observations), and

- a shrinkage factor of 0.005. The boosted regression models we used “specify a set (or sets) of rules and measures for assessing the balance, or equivalence, established on the pretreatment covariates of the treatment and weighted control group” (Ridgeway et al. 2012:3). We report here the results using the maximum Kolmogorov–Smirnov statistic stopping rule (for a technical discussion, see Ridgeway et al. 2012) that resulted in a similar minima to the alternative stopping rule (suggesting the results would not be sensitive to the particular stopping rule used).
4. We cannot know for certain whether the respondents could possibly have been classified as gang members in 2003 or before. This is indeed a limitation of our analysis, but one we simply cannot redress with the available data. This, however, has implications for the use of the Eurogang measure in survey research. Researchers using this question need to be aware of the particular difficulties that this method presents in terms of controlling for past gang membership.
 5. Lagged measures of outcomes, however, are not absent of problems that makes them a more conservative test. Decker et al. (2012:10–11) note that “if onset of gang membership for person i is measured at wave 2, yet they report having left the gang at wave 3, measures of the behavioural outcomes of gang membership are potentially confounded by the inclusion of nongang time no matter whether one uses the wave 2 or wave 3 measures of behaviour.” They then argue that “the contemporaneous measures of behavior at wave 2 allow one to be relatively certain that the recall period for the behavior in question includes at least some time in the gang, and thus may more adequately represents the effect of gang membership if sources of selection are adequately controlled through wave 1 observed measurements.” We do not find this argument particularly compelling. There is typically no basis to infer that there is more meaningful time in the gang before or after survey administration. In our view, if the point of the analysis is estimating impact, then lagged measures constitute a more solid test insofar as they allow establishing temporal order.
 6. Results aiming to minimize the absolute standardized mean were virtually indistinguishable.
 7. For example, it could be hypothesized that gangs have a stronger effect in higher-risk environments where there are fewer avenues for the development of legitimate roles (Hall et al. 2006) and where the high threat of violence may reinforce group cohesion, retaliatory cycles, and isolation from social institutions (Decker and Van Winkle 1996). Equally, it could be hypothesized that less institutionalized gangs may have a weaker impact on the developmental paths of individuals than those who have a more encompassing dimension to affiliation. Indeed, emerging cross-national research suggest that levels of gang organization are associated with increased levels of offending and victimization (Pyrooz et al. 2012).

References

- Aldridge, Judith, Juanjo Medina-Ariza, and Robert Ralphs. 2012. "Counting Gangs: Conceptual and Validity Problems with the Eurogang Definition." Pp. 35-51 in *Youth Gangs in International Perspective*, edited by F. Esbensen and C. Maxson. New York: Springer.
- Anderson, Elijah. 1999. *Code of the Street*. New York: W. W. Norton.
- Augustyn, Megan B., Terence Thornberry, and Marvin Krohn. 2011. "The Cascading Effect of Gang Membership: Pathways to Maladaptive Parenting." Paper presented at the 63rd Annual Meeting of the American Society of Criminology, Washington, DC, November 16–19.
- Bang, Heejung and James M. Robins. 2005. "Doubly Robust Estimation in Missing Data and Causal Inference Models." *Biometrics* 61:962-72.
- Barnes, J. C., Kevin M. Beaver, and J. Mitchell Miller. 2010. "Estimating the Effect of Gang Membership on Nonviolent and Violent Delinquency: A Counterfactual Analysis." *Aggressive Behavior* 36:437-51.
- Barnes, J. C., Brian B. Boutwell, and Kathleen A. Fox. 2011. "The Effects of Gang Membership on Victimization: A Behavioral Genetic Explanation." *Youth Violence and Juvenile Justice* 10:227-44.
- Bendixen, Mons, Inger M. Endresen, and Dan Olweus. 2006. "Joining and Leaving Gangs: Selection and Facilitation Effects on Self-Reported Antisocial Behaviour in Early Adolescence." *European Journal of Criminology* 3:85-114.
- Benjamini, Yoav and Yosef Hochberg. 1995. "Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing." *Journal of the Royal Statistical Society Series B*, 57:289-300.
- Bernburg, Jón Gunnar, Maivin D. Krohn, and Craig J. Rivera. 2006. "Official Labeling, Criminal Embeddedness, and Subsequent Delinquency: A Longitudinal Test of Labeling Theory." *Journal of Research in Crime and Delinquency* 43:67-88.
- Bradshaw, Paul. 2005. "Terrors and Young Teams: Youth Gangs and Delinquency in Edinburgh." Pp. 193-218 in *European Street Gangs and Troublesome Youth Groups*, edited by Scott H. Decker and Frank M. Weerman. Oxford, UK: Altamira Press.
- Brown, B. B. 2004. "Adolescents' Relationships with peers." Pp. 363-94 in *Handbook of Adolescent Psychology*, edited by R. M. Lerner and L. Steinberg. 2nd ed. Hoboken, NJ: John Wiley.
- Caliendo, Marco and Sabine Kopeinig. 2008. "Some Practical Guidance for the Implementation of Propensity Score Matching." *Journal of Economic Surveys* 22:31-72.
- Decker, Scott H., Chris Melde, and David C. Pyrooz. 2012. "What do We Know About Gangs and Gang Members and Where Do We Go From Here?" *Justice Quarterly* 30:369-402. doi:10.1080/07418825.2012.732101

- Decker, Scott H. and Frank. Weerman. 2005. *European Street Gangs and Troublesome Youth Groups*. Oxford, UK: Altamira Press.
- Decker, Scott H. and Barrik Van Winkle. 1996. *Life in the Gang*. Cambridge, UK: Cambridge University Press.
- DeLisi, Matt, J. C. Barnes, Fevin M. Beaver, and Chris L. Gibson. 2009. "Delinquent Gangs and Adolescent Victimization Revisited: A Propensity Score Matching Approach." *Criminal Justice and Behavior* 36:808-23.
- Dishion, Thomas J., Kathleen M. Spracklen, David W. Andrews, and Gerald R. Patterson. 1996. "Deviance Training in Male Adolescent Friendships." *Behavior Therapy* 27:373-90.
- Finney, Nissa and Ludi Simpson. 2009. *Sleepwalking to Segregation? Challenging Myths about Race and Migration*. Bristol, UK: Policy Press.
- Felson, M. 2006. *Crime and Nature*. Thousand Oaks, CA: Sage.
- Gatti, Uberto, Sandrine Haymoz, and Hans M. A. Schadee. 2011. "Deviant Youth Groups in 30 Countries: Results from the Second International Self-Report Delinquency Study." *International Criminal Justice Review* 21:208-24.
- Gatti, Uberto, Richard E. Tremblay, Frank Vitaro, and Pierre McDuff. 2005. "Youth Gangs, Delinquency and Drug Use: A Test of the Selection, Facilitation, and Enhancement Hypotheses." *Journal of Child Psychology and Psychiatry* 46: 1178-90.
- Gibson, Chris L., Marc L. Swatt, J. Mitchell Miller, Wesley G. Jennings, and Angela R. Gover. 2012. "The Causal Relationship Between Gang Joining and Violent Victimization: A Critical Review and Directions for Future Research." *Journal of Criminal Justice* 40:490-501.
- Gordon, Rachel A., Benjamin B. Lahey, Eriko Kawai, Rolf Loeber, Magda Stouthamer-Loeber, and David P. Farrington. 2004. "Antisocial Behavior and Youth Gang Membership: Selection and Socialization." *Criminology* 42:55-87.
- Guo, Shenyang and Mark W. Fraser. 2010. *Propensity Score Analysis*. Los Angeles, CA: Sage.
- Hainey, Dana L., and D. Wayne Osgood. 2005. "Reconsidering Peers and Delinquency: How do Peers Matter?" *Social Forces* 84:1109-30.
- Hall, Gena Penley, Terence P. Thornberry, and Alan J. Lizotte. 2007. "The Gang Facilitation Effect and Neighborhood Risk: Do Gangs Have a Stronger Influence on Delinquency in Disadvantaged Areas?" Pp. 47-61 in *Studying Youth Gangs*, edited by James F. Short and Lorine A. Hughes. Lanham, MD: Altamira Press.
- Hartup, Willard W. 2005. "Peer Interaction: What Causes What?" *Journal of Abnormal Child Psychology* 33:387-94.
- Haviland, Amelia, Daniel S. Nagin, and Paul R. Rosenbaum. 2007. "Combining Propensity Score Matching and Group-Based Trajectory Analysis in an Observational Study." *Psychological Methods* 12:247-67.

- Hayden, Carol. 2008. *Staying Safe and Out of Trouble: A Survey of Young People's Perceptions and Experiences*. Hampshire, England: University of Portsmouth.
- Hennigan, K., and M. Spanovic. 2012. "Gang Dynamics Through the Lens of Social Identity Theory." Pp. 127-49 in *Youth Gangs in International Perspective*, edited by Finn-Age Esbensen and Cheryl L. Maxson. New York: Springer.
- Ho, Daniel E., Kosuke Imai, Gary King, and Elizabeth A. Stuart. 2007. "Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference." *Political Analysis* 15:199-236.
- Hopkins, Matt, Nick Tilley, and Kate Gibson. 2012. "Homicide and Organized Crime in England." *Homicide Studies*. Retrieved June 27, 2013 (doi:10.1177/1088767912461786).
- Hosmer, David W. and Stanley Lemeshow. 2000. *Applied Logistic Regression*. 2nd ed. New York: John Wiley.
- Huizinga, David and Kimberly L. Henry. 2008. "The Effect of Arrest on Subsequent Behavior: Findings from Longitudinal and Other Studies." Pp. 220-54 in *The Long View of Crime: A Synthesis of Longitudinal Research*, edited by Akiva M. Liberman. New York: Springer.
- Katz, Charles M., Vincent J. Webb, Kate Fox, and Jennifer N. Shaffer. 2011. "Understanding the Relationship Between Violent Victimization and Gang Membership." *Journal of Criminal Justice* 39:48-59.
- Klein, Malcolm W. 2011. "Who can you Believe? Complexities of International Street Gang Research." *International Criminal Justice Review* 21:197-207.
- Klein, Malcolm W., Maxson, and Cheryl. 2006. *Street Gang Patterns and Policies*. New York: Oxford University Press.
- Klein, Malcolm W., Frank M. Weerman, and Terrence P. Thornberry. 2006. "Street Gang Violence in Europe." *European Journal of Criminology* 3:413-37.
- Kreager, Derek A., Kelly Rulison, and James Moody. 2011. "Delinquency and the Structure of Adolescent Peer Groups." *Criminology* 49:95-127.
- Krohn, Marvin D. and Terrence P. Thornberry. 2008. "Longitudinal Perspectives on Adolescent Street Gangs." Pp. 128-60 in *The Long View of Crime: A Synthesis of Longitudinal Research*, edited by Akiva M. Liberman. New York: Springer.
- Lee, Brian K., Justin Lessler, and Elizabeth A. Stuart. 2010. "Improving Propensity Score Weighting Using Machine Learning." *Statistics in Medicine* 29:337-46.
- Lee, Brian K., Justin Lessler, and Elizabeth A. Stuart. 2011. "Weight Trimming and Propensity Score Weighting." *PLoS ONE* 6:e18174. doi:10.1371/journal.pone.0018174
- Lumley, Thomas. 2010. *Complex Surveys: A Guide to Analysis Using R*. New York: John Wiley.
- Matsuda, Kristy N., Finn-Age Esbensen, and Dena C. Carson. 2012. "Putting the 'Gang' in 'Eurogang': Characteristics of Delinquent Youth Groups by Different

- Definitional Approaches.” Pp. 17-34 in *Youth Gangs in International Perspective*, edited by Finn-Age Esbensen and Cheryl L. Maxson. New York: Springer.
- Matsuda, Kristy N., Chris Melde, Terrance J. Taylor, Adrienne Freng, and Finn-Age Esbensen. 2012. “Gang Membership and Adherence to the ‘Code of the Street’.” *Justice Quarterly* 30:440-68. Retrieved June, 2012 <http://dx.doi.org/10.1080/07418825.2012.684432>
- McAra, Lesley and Susan McVie. 2006. “The Usual Suspects? Street Life, Young People and the Police.” *Criminal Justice* 5:5-36.
- McCaffrey, Daniel F., Greg Ridgeway, and Andrew R. Morral. 2004. “Propensity Score Estimation with Boosted Regression for Evaluating Causal Effects in Observational Studies.” *Psychological Methods* 9:403-25.
- Medina, Juanjo. 2013. “Police-initiated Contacts: Young People, Ethnicity, and the ‘Usual Suspects’.” *Policing and Society*. Retrieved June 27, 2013 (doi:10.1080/10439463.2013.784301).
- Medina, Juanjo, Judith Aldridge, John Shute, Andy Ross, and Andreas Cebulla, 2013. “Measuring Gang Membership in England and Wales: A Latent Class Analysis Approach with Eurogang Survey Questions.” *European Journal of Criminology*. Retrieved June 27, 2013 (doi:10.1177/1477370813475393).
- Melde, Chris and Finn-Age Esbensen. 2011a. “Gang Membership as a Turning Point in the Life Course.” *Criminology* 49:513-52.
- Melde, Chris and Finn-Age Esbensen. 2011b. “The Proximate Impact of Gang Membership: A Turning Point Framework.” Paper presented at the 63rd Annual Meeting of the American Society of Criminology, Washington, DC, November 16–19.
- Melde, Chris and Finn-Age Esbensen. 2012. “The Onset of (Euro)Gang Membership as a Turning Point in the Life Course.” Pp. 169-87 in *Youth Gangs in International Perspective*, edited by Finn-Age Esbensen and Cheryl L. Maxson. New York: Springer.
- Melde, Chris, Terrance J. Taylor, and Finn-Age Esbensen. 2009. “‘I got your back’: An Examination of the Protective Function of Gang Membership in Adolescence.” *Criminology* 47:565-94.
- Moffit, Terrie E. 1993. “‘Life-course Persistent’ and ‘Adolescent-Limited’ Antisocial Behavior: A Developmental Taxonomy.” *Psychological Review* 100: 674-701.
- Monahan, Kathryn C., Laurence Steinberg, and Elizabeth Cauffman. 2009. “Affiliation with Antisocial Peers, Susceptibility to Peer Influence, and Antisocial Behavior during the Transition to Adulthood.” *Developmental Psychology* 45:1520-30.
- Oberwittler, Dietrich. 2012. “Why Doesn’t it Happen in Germany, too? Police Legitimacy, Stop & Search Practices and the Role of Neighbourhood Disadvantage.” Paper presented at the Cathie Marsh Centre Seminar Series, Manchester, England, November 9, 2012.

- Osgood, Wayne D., Janet K. Wilson, Patrick M. O'Malley, Jerald G. Bachman, and Lloyd D. Johnston. 1996. "Routine Activities and Individual Deviant Behavior." *American Sociological Review* 61:635-55.
- Ozer, Murat M. and Robin S. Engel. 2012. "Revisiting the Use of Propensity Score Matching to Understand the Relationship Between Gang Membership and Violent Victimization: A Cautionary Note." *Justice Quarterly* 29:105-24. doi: 10.1080/07418825.2011.561804
- Patterson, Gerard R., Thomas J. Dishion, and Karen Yoerger. 2001. "Adolescent Growth in New Forms of Problem Behavior: Macro and Micro-Peer Dynamics." *Prevention Science* 1:3-13.
- Pyrooz, David C. and Scott H. Decker. 2011. "From Colors and Gangs to Caps and Gowns? The Relationship Between Gang Membership and Educational Attainment." Paper presented at the 63rd Annual Meeting of the American Society of Criminology, Washington, DC, November 16-19.
- Pyrooz, David C., Andrew M. Fox, Charles M. Katz, and Scott H. Decker. 2012. "Gang Organization, Offending and Victimization: A Cross-National Analysis." Pp. 85-105 in *Youth Gangs in International Perspective*, edited by Finn-Age Esbensen and Cheryl L. Maxson. New York: Springer.
- Ralphs, Robert, Juanjo Medina, and Judith Aldridge. 2009. "Who Needs Enemies with Friends like These? The Importance of Place for Young People Living in Known Gang Areas." *Journal of Youth Studies* 12:483-500.
- Ridgeway, Gary. 2006. "Assessing the Effect of Race Bias in Post-Traffic Stop Outcomes Using Propensity Scores." *Journal of Quantitative Criminology* 22:1-29.
- Ridgeway, Gary. 2007. *GBM 1.5 package manual*. Retrieved May, 2007 (<http://cran.r-project.org/doc/packages/gbm.pdf>).
- Ridgeway, Gary, Dan McCaffrey, Andrew Morral, Lane Burgette, and Beth Ann Griffin. 2012. "Toolkit for Weighting and Analysis of Nonequivalent Groups: A Tutorial for the Twang Package." Retrieved January 5, 2013 (<http://cran.r-project.org/web/packages/twang/vignettes/twang.pdf>).
- Rorie, Melissa, Denise C. Gottfredson, Amanda Cross, Denise Wilson, and Nadine M. Connell. 2011. "Structure and Deviance Training in After-School Programs." *Journal of Adolescence* 34:105-17.
- Rostami, Amir, Frederik Leinfelt, and Stefan Holgersson. 2012. "An Exploratory Analysis of Swedish Street Gangs: Applying the Maxson and Klein Typology to a Swedish Gang Dataset." *Journal of Contemporary Criminal Justice* 28: 426-45. doi:10.1177/1043986212458195
- Sampson, Robert J. and John H. Laub. 2005. "A Life-Course View of the Development of Crime." *The Annals of the American Academy of Political and Social Science* 602:12-45.

- Schonlau, Matthias. 2005. "Boosted Regression (boosting): An Introductory Tutorial and a Stata Plugin." *The Stata Journal* 5:330-54.
- Sharp, Clare, Judith Aldridge, and Juanjo Medina. 2006. *Delinquent Youth Groups and Offending Behaviour: Findings from the 2004 Offending Crime and Justice Survey*. London, UK: Home Office.
- Shute, John, Judith Aldridge, and Juanjo Medina. 2012. "Loading the Policy Blunderbuss." *Criminal Justice Matters* 87:40-41.
- Snyder, James, Lynn Schrepferman, Jessica Oeser, Gerald Patterson, Mike Stoolmiller, Kassy Johnson, and Abigail Snyder. 2005. "Deviance Training and Association with Deviant Peers in Young Children: Occurrence and Contribution to Early-Onset Conduct Problems." *Development and Psychopathology* 17:397-413.
- Short, J. F. and F. L. Strodbeck. 1965. *Group Process and Gang Delinquency*. Chicago, IL: University of Chicago Press.
- Stuart, Elizabeth A. 2010. "Matching Methods for Causal Inference: A Review and Look Forward." *Statistical Science* 25:1-21.
- Sweeten, Gary, David C. Pyrooz, and Alex R. Piquero. 2012. "Disengaging from Gangs and Desistance from Crime." *Justice Quarterly* 30:469-500. doi:10.1080/07418825.2012.723033
- Thornberry, Terence P., Marvin D. Krohn, Alan J. Lizotte, and Deborah Chard-Wierschem. 1993. "The Role of Juvenile Gangs in Facilitating Deviant Behavior." *Journal of Research in Crime and Delinquency* 30:55-87.
- Thornberry, Terence P., Marvin D. Krohn, Alan J. Lizotte, Carolyn A. Smith, and Kimberly Tobin. 2002. *Gangs and Delinquency in Developmental Perspective*. Cambridge, UK: Cambridge University Press.
- van Gemert, Frank, Dana Peterson, and Inger-Lise Lien. 2008. *Street Gangs, Migration and Ethnicity*. Cullompton, UK: Willan.
- Vigil, D. 1988. "Group Processes and Street Identity: Adolescent Chicano Gang Members." *Ethos* 16:421-45.
- Wacquant, Loïc. 2008. *Urban Outcasts*. Cambridge, MA: Polity Press.
- Weerman, Frank M., Cheryl L. Maxson, Finn-Age Esbensen, Judith Aldridge, Juanjo Medina, and Frank van Gemert. 2009. *Eurogang Program Manual*. University of Missouri at St Louis. Retrieved October 10, 2012 (<http://www.umsl.edu/ccj/eurogang/EurogangManual.pdf>).
- Winfree, Thomas L., G. Larry Mays, and Teresa Vigil-Backstrom. 1994. "Youth Gangs and Incarcerated Delinquents: Exploring the Ties Between Gang Membership, Delinquency, and Social Learning Theory." *Justice Quarterly* 11:229-56.
- Winfree, L. Thomas, Elmar Weitekamp, Hans-Juergen Kerner, Kerstin Weerman, Juanjo Medina, Judith Aldridge, and Almir Maljevic. 2007. "Youth Gangs in Five Nations." Paper presented at the Annual Meeting of the American Society of Criminology, Atlanta, GA, November 14-17.

Author Biographies

Juan José Medina Ariza is a senior lecturer in criminology at the University of Manchester and a member of the Steering Committee of the Eurogang Network. His research focuses on youth gangs, interpersonal violence, spatial analysis, and crime control policy.

Andreas Cebulla is a senior research fellow at Flinders University and for the duration of the project was working at the National Centre for Social Research.

Judith Aldridge is a senior lecturer in criminology at the University of Manchester and a member of the Steering Committee of the Eurogang network. Her research focuses on youth gangs, recreational drug use, and drug dealing.

Jon Shute is a lecturer in criminology at the University of Manchester. His research focuses on developmental criminology, evaluation of early childhood intervention programs, theoretical rapprochement between psychology and criminology, and mass violence.

Andy Ross is currently studying for his PhD at the Institute for Social and Economic Research, Essex University. His research focuses on young people, their well-being, and the individualization of the life course. His contribution to the present study was as a research director at the National Centre for Social Research.