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## Collective Efficacy, Family Attachment, and Urban Adolescent Suicide Attempts

David Maimon<sup>1</sup>, Christopher R. Browning<sup>2</sup>, and Jeanne Brooks-Gunn<sup>3</sup>

<sup>1</sup> University of Maryland <sup>2</sup> Ohio State University <sup>3</sup> Columbia University

### Abstract

The suicide rate among American adolescents between the ages of 14–25 has dramatically increased during the last 50 years, and this fact has been the focus of extensive social-scientific investigation. To date, however, research focusing on the joint effects of mental health, family, and contextual-level predictors on adolescents' suicidal behaviors is scarce. Drawing on Durkheim's classic macro-level approach to suicide and collective efficacy theory, we use data from the Project on Human Development in Chicago Neighborhoods (PHDCN) to examine the effect of informal social controls on adolescents' suicide attempts. Analyzing reports from 990 youth, we examine the hypothesis that neighborhood-level collective efficacy and family-level integration and social control independently affect suicide attempts. We also examine the extent to which they interact in their effects on suicidal behavior. Overall, results from multilevel logit models support the Durkheimian expectation that family attachment reduces the probability that adolescents will attempt suicide. The effect of collective efficacy is interactive in nature. Specifically, we find that collective efficacy significantly enhances the protective effect of family attachment and support on adolescent suicidal behaviors. We discuss findings within the context of social control theory.

### Keywords

adolescents; suicide attempts; neighborhoods; social control

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Suicide among American adolescents has dramatically increased during the last 50 years, and it has become the third leading cause of death among youth between the ages of 14–25 (National Center for Health Statistics 2007). Sociological and psychological studies have indicated that both contextual factors (for instance, social disorganization, lack of family support, and poor peer relationships; Perez-Smith, Spirito, and Boergers 2002) and individual-level predictors (i.e., depression, emotionality, impulsivity; Brezo, Paris, and Turecki 2006) are associated with suicide, suicide attempts, and suicide ideation. However, to date, only a few studies have focused on the joint effect of personality and contextual-level predictors on adolescents' suicidal behaviors (Maimon and Kuhl 2008). Moreover, no prior study has tested the interactive effects of family and neighborhood informal controls on suicide attempts. Addressing this empirical gap, we rely on Durkheim's ([1897] 1951) theory of suicide and the social control perspective (Hirschi 1969; Sampson and Laub 1993; Sampson, Raudenbush, and Earls 1997) and investigate the simultaneous and interactive effects of family and neighborhood informal controls on adolescents' suicidal behavior.

## THEORETICAL BACKGROUND

### Durkheim's Suicide Theory

One of the first to offer a sociological explanation of suicide was Emile Durkheim ([1897] 1951). Aware of the intuitive appeal of psychological explanations for suicide (i.e., depression and imitation), Durkheim insisted that suicide rates are social facts, *sui generis*, that could be studied using sociological concepts and methods. Examining suicide within several European countries, Durkheim concludes that suicide rates vary inversely with the degree of social integration (i.e., the extent of attachment to social groups) and moral regulation (i.e., society's ability to exert normative regulation upon its members) experienced by individuals within religious, domestic, and political collectivities. According to Durkheim, insufficient social integration enhances individualism and encourages egoistic suicide, while a society that is unable to regulate individuals' naturally unlimited ambitions and aspirations creates fertile ground for anomic suicide (Durkheim [1897] 1951). Durkheim offers evidence that suicide rates increase with the attenuation of social integration and normative regulation within societies.

Some subsequent research on suicide offers support for Durkheim's claims. Several studies suggest that affiliation with conservative religious groups serves as a protective mechanism against suicide and other deviant behaviors (Breault 1986; Stack 1985). Other studies confirm Durkheim's family integration hypothesis, finding that marital and family stability are associated with lower suicide rates (Baller and Richardson 2002; O'Brien and Stockard 2006; Stockard and O'Brien 2002). Finally, Pescosolido and Georgianna (1989) suggest that social ties that are based on religious affiliation provide support and guidance (i.e., regulation) against suicide.

Consistent with Durkheim's approach, most prior sociological studies use aggregate data to account for country- or city-level suicide rates, and they tend not to include individual and contextual predictors of suicide simultaneously. Nevertheless, a recent study by Maimon and Kuhl (2008) emphasizes the need for simultaneous investigation of structural and individual-level processes in the study of suicide, demonstrating that adolescent depression is more likely to result in suicide attempts when taking place within secular residential communities. Building on Maimon and Kuhl's (2008) approach, the current study offers a simultaneous examination of the determinants of suicide at both macro and micro levels. However, in contrast to Maimon and Kuhl's emphasis on community-level religiosity, we focus on the simultaneous and interactive effects of family and neighborhood informal controls on adolescents' suicide attempts. Elaborating on the integrative and regulative function exerted by neighborhoods, we hypothesize that neighborhood demographic characteristics and "collective efficacy" provide an additional circle of influence relevant to suicidal behaviors. Then, acknowledging the role of family informal controls on suicidal behaviors, we study the interactive effects of family and neighborhood informal controls on adolescents' suicide attempts.

### Neighborhood-level Effects on Suicidal Behaviors

**Neighborhood social disorganization and suicide**—The observation that neighborhood characteristics are linked to crime and health rates dates back to Shaw and McKay's (1942) classic work. In their monumental study of the city of Chicago, these authors identified poor economic conditions, population turnover, and racial and ethnic heterogeneity as key structural factors that disrupt the ability of neighborhoods to exert social control. This situation, termed "social disorganization," was hypothesized to account for variation in delinquency, mortality, disease, and crime rates across Chicago neighborhoods.

During the last two decades numerous studies have found support for the claims raised by social disorganization theorists. However, relatively few studies have focused on the effects of neighborhood characteristics on suicide; even fewer have considered suicide attempts. In one of the earliest attempts to examine the relationship between suicide and social disorganization within an urban setting, Cavan (1928) found that suicide rates in Cook County between the years 1919 and 1921 were higher in areas with high divorce rates and concentrations of pawn shops. In accordance with these findings, Kubrin, Wadsworth, and DiPietro (2006) found that concentrated disadvantage and unemployment rates increase suicide among young African American males. Finally, Wadsworth and Kubrin (2007) found that living in affluent metropolitan areas in the United States is negatively associated with Hispanic immigrants' suicide rates. Although important contributions, these studies maintain a focus on macro-level factors, to the exclusion of individual-level processes. In addition, these analyses do not assess the effect of social control directly on suicide, but assume it by the presence of disadvantage. We address these limitations by simultaneously examining the impact of neighborhood and individual characteristics on suicide attempts among adolescents, focusing on the direct and interactive effects of neighborhood *collective efficacy* (Sampson et al. 1997).

**Collective efficacy and urban adolescent suicide attempts**—Consistent with the social disorganization perspective, collective efficacy theory emphasizes the importance of informal social control within neighborhoods (Sampson et al. 1997). Relying on Bandura's (1986) description of collective efficacy perceptions, Sampson et al. (1997) assert that neighborhood collective efficacy can be understood as the combination of mutual trust and the shared willingness of residents to intervene on behalf of the common good. Although Sampson and colleagues propose a mechanism that facilitates informal social control without requiring strong ties or associations (Morenoff, Sampson, and Raudenbush 2001), they suggest that social networks can enhance collective efficacy. In turn, they argue that collective efficacy contributes to the capacity of communities to regulate their members according to desired principles (Sampson et al. 1997).

Collective efficacy has typically been applied to behaviors that take place largely in public space. During the last decade, extant research has established the role of neighborhood collective efficacy in regulating delinquency and crime, regardless of the demographic composition of the population (Sampson et al. 1997; Simons et al. 2005). More recent studies, however, have linked collective efficacy with more private behaviors. Browning (2002), for instance, has found that neighborhood collective efficacy is negatively associated with intimate homicide rates and nonlethal partner violence in Chicago. Women in neighborhoods with high collective efficacy were also more likely to disclose conflicts in their relationships to various sources of support in the neighborhood. More recently, Browning, Leventhal, and Brooks-Gunn (2005) examined the effect of collective efficacy on sexual initiation in early adolescence, finding that neighborhood collective efficacy delays sexual onset for adolescents who experience lower levels of parental monitoring.

In line with these studies, we hypothesize that collective efficacy may also regulate the risk of adolescent suicidal behaviors. Particularly, we assert that the capacity of the community to influence adolescents' suicidal behaviors rests on the existence of social ties between parents and youth and expectations for intergenerational support and supervision in the neighborhood. While we acknowledge that the more "private" the behavior, the less influence the community is likely to have, we hypothesize that neighborhood normative orientations remain relevant even for suicidal behavior. Drawing on Coleman's (1990) discussion of intergenerational closure (i.e., social ties linking parents with the parents of their children's friends), and Browning and colleagues' (2005) operationalization of this concept, we suggest that the capacity to disseminate information efficiently, share

supervision responsibilities, and reinforce adolescents' sense of belonging are likely to enhance social control beyond what would be possible for individual families. Thus, we expect that the combination of social cohesion, intergenerational closure, and expectations for active support and supervision of youth by local adults will exert regulatory effects on the prevalence of adolescents' suicide attempts. Moreover, we suspect that neighborhood collective efficacy will also reinforce family expectations and norms. Thus, in addition to the direct effect of neighborhood collective efficacy on adolescents' suicidal behaviors, we consider the potential for neighborhood collective efficacy to amplify the beneficial effect of family attachment and support upon adolescent suicidal tendencies.

### Individual-level Effects on Suicidal Behaviors

**Family processes**—Social control theories emphasize the role of parental and family control and supervision in preventing adolescents' engagement in deviant behaviors (Hirschi 1969; Sampson and Laub 1993). According to Hagan (1989), parents induce their children to conform through both direct and indirect controls. Direct control is the explicit effort exerted by parents to monitor their children's behaviors. Parental indirect control, on the other hand, operates through children's attachment to their parents and provides a source of constraint on the inclination to deviate even when parents are absent (Hagan 1989).

We emphasize the role of indirect control in the form of child-parent attachments in reducing the likelihood of suicide attempts. Although direct parental control is an important inhibitor of deviant behavior, parents cannot monitor their children's activities (particularly those of adolescents) for long periods of time during the day. In fact, in most cases parents work outside their homes and spend a significant amount of time away from their children. Thus, indirect control, defined by Hirschi (1969) as the psychological presence of the parents when the temptation to commit a deviant act appears, may be a vital and consistently regulatory process in preventing youth from engaging in problem behaviors.

An adolescent's attachment to parents and caregivers is likely to raise the psychic costs associated with behavior that parents would negatively sanction. The anticipated reaction of parents to adolescent suicide or attempted suicide will exert more influence on those adolescents who maintain strong emotional bonds with their parents. Weak emotional bonds to parents, themselves, may also contribute to suicidal feelings among some adolescents. Overall, most prior research confirms the prediction that parental attachment reduces adolescents' tendency to engage in a wide range of delinquent activities (Rankin and Wells 1990; Wright and Cullen 2001), including suicidal behaviors (Essau 2004; Haynie, South, and Bose 2006). Thus, in line with this view, we hypothesize that family attachment and support will reduce the probability of attempting suicide during adolescence.

Although family members may serve as sources of social support (Bernburg, Thorlindsson, and Sigfusdottir 2009), they may also provide behavioral models that encourage suicidality. Operationalized differently by several scholars, much empirical evidence supports the role of exposure to suicidal behaviors and imitation in facilitating deviant and suicidal behaviors (Baller and Richardson 2002; Stack 2005; Thorlindsson and Bjarnason 1998). Accordingly, we also examine whether exposure to family members' and friends' suicidal behaviors affect adolescent suicide attempts.

**Psychological predictors of suicide**—Personality traits have also been linked with suicidal behaviors but have received less attention in the sociological literature on suicide. While this omission was understandable in the past, the availability of multilevel data and statistical tools allow more thorough investigation of social phenomena utilizing both individual and structural constructs. Thus, we incorporate measures of depression, impulsivity, emotionality, and sociability in our analysis. Overall, the relationships among

suicide attempts, depression, and impulsivity are well established in research on mental health, indicating that both depression and impulsivity are positively associated with suicide and suicide attempts (Brezo, Paris, and Turecki 2006; Michaelis et al. 2004; Gil 2003; Stalenheim 2001; Verkes et al. 1996). Moreover, emotionality (i.e., the physiological component of anxiety, manifest as muscle tension, elevated heart rate, sweating, etc.) is also found to be associated with suicide attempts (Useda et al. 2004; Verona, Patrick, and Joiner 2001). Finally, Nelson, Nielsen, and Checketts (1977) report that sociability is an important predictor of individuals' suicidal behaviors.

While psychological and sociological studies have emphasized the distinct determinants of suicide, the association between substance use and suicidal behaviors has long been recognized by both bodies of research (Borges, Walters, and Kessler 2000; Haynie, South, and Bose 2006; Windle, Miller-Tutzauer, and Domenico 1992). Windle and colleagues (1992), for instance, indicate that the prevalence of both suicidal ideation and attempts increases among adolescents who frequently use alcohol. In line with these important findings, we incorporate a measure of substance abuse in our analysis.

### **Collective Efficacy, Family Factors, and Adolescent Suicide Attempts**

Adopting Bronfenbrenner's (1979) view that human behavior is embedded within particular environmental contexts and is the product of both direct and interactive social effects, we hypothesize that families living in communities with strong collective efficacy are likely to exert more effective indirect control upon their children. A key mechanism through which collective efficacy may amplify the beneficial effects of family attachment and support relates to the role of normative consistency in promoting adolescent mental health. The emotional link between parent and child is a principal conduit for the communication of normative expectations from parent to child. As noted, youth with strong attachment to parents are less likely to violate parental expectations for fear of threatening a significant emotional bond (Rankin and Wells 1990). Youth with strong ties to parents, however, are also likely to better understand the rationale behind norms themselves (independent of their support by parents). For instance, values regarding self-respect, shame, individual integrity, and avoiding violence (to others and oneself) may be more effectively assimilated when parents foster strong ties to their children (Svensson 2004). At the same time, the successful communication and assimilation of normative expectations within families may be supported when communities are integrated and reinforce those expectations. High collective efficacy environments in which the sense of shared values among community members is coherent and strong may strengthen the link between family attachment and youth inculcation of behavioral expectations. This consistency in the strength of normative expectations across family and neighborhood environments may minimize confusion among adolescents and strengthen the force of norms regarding both the treatment of others and oneself. Indeed, Simons and colleagues (2005) find evidence of an amplification process whereby the deterrent effect of authoritative parenting on delinquency and affiliation with deviant peers is enhanced when administered within neighborhoods with high collective efficacy (Simons et al. 2005).

In sum, we integrate in this work a neighborhood-level emphasis with attention to the family context of suicidal behavior among adolescents. In addition to considering the effects of a number of mental health constructs, we test whether family social control—here operationalized as parent-child attachment and support—is a principal mechanism by which adolescent mental health is fostered.<sup>1</sup> We also incorporate the effect of neighborhood collective efficacy as an additional circle of social control, hypothesizing that collective efficacy reduces the likelihood of suicide attempts. Although psychological processes, and depression in particular, are the more proximate and powerful determinants of suicidal behavior, we suggest that ignoring contextual characteristics in general, and neighborhood



social processes in particular (i.e., collective efficacy) may present an incomplete picture of the etiology of suicide attempts. Thus, as part of our goal to examine the interactive effects of individual- and neighborhood-level constructs, we focus on the cross-level interaction between family attachment and collective efficacy. We contend that neighborhood collective efficacy amplifies the beneficial effect of family attachment through facilitating effective social control of youth and reinforcing the normative expectations communicated through strong parent-child ties.

## DATA AND METHODS

This study relies on several independent data sources gathered by the Project on Human Development in Chicago Neighborhoods (PHDCN). All individual-level data are drawn from the two waves (1994–1997–1997–1999) of the PHDCN Longitudinal Cohort Study (PHDCN-LCS). Census tract and “neighborhood cluster” (NC—aggregations of 1 to 3 census tracts) data are drawn from the 1990 decennial Census and the PHDCN Community Survey (PHDCN-CS).

### Design

**Individual-level measures**—The Project on Human Development in Chicago Neighborhoods was initiated in 1994 as an effort to collect high quality data on neighborhood environments and examine the implications of community context for adolescent development. For the longitudinal cohort study, Chicago’s 865 census tracts were combined into 343 relatively homogenous neighborhood clusters (with respect to census tract racial, ethnic, socioeconomic housing and family structure characteristics). The resulting ecological units contained 8,000 people on average. Next, in order to help reduce the confounding between ethnic mix and socioeconomic status and obtain a near-balanced design, the 343 neighborhood clusters were stratified by seven categories of racial-ethnic composition and three categories of socioeconomic status (high, medium, and low). This objective was approximated with only three exceptions (low income primarily European-American, high income primarily Latino, and high income Latino–African American neighborhoods did not exist within Chicago’s municipal boundaries in 1990), and resulted in a sample of 80 neighborhood clusters. Within these 80 neighborhood clusters, approximately 6,500 children falling within seven age cohorts (0, 3, 6, 9, 12, 15, and 18 years) were sampled randomly (for more extensive discussion on the sampling procedure see Sampson et al. 2005). Extensive in-home interviews were conducted with these children and their primary caregivers at two time points (wave 1 in 1994–1997 and wave 2 in 1997–1999) over a four-year period. The response rates for the first and second waves of data collection were 78 percent and 85 percent, respectively.

**Neighborhood-level measures**—The PHDCN-CS is a probability sample of 8,782 adult residents of Chicago. The goal of the PHDCN-CS was to inquire about aspects of the neighborhoods in which these adults lived. This survey was conducted independently from the longitudinal cohort study between the years 1994–1995, and it used a three-stage sampling strategy. First, city blocks within Chicago’s 343 neighborhood clusters were randomly selected. Second, households within these blocks were randomly selected. Finally, individuals within households (one adult age 18 years or older per household) were randomly selected to complete a survey questionnaire (the final response rate reached 75%). In order to allow estimation of neighborhood characteristics on the basis of aggregate

<sup>1</sup>According to the psychiatric perspective on suicide, chemical and neurological deficits in the brain impede efforts to promote parent-child attachment (see, for instance, Mann 2002). Although we recognize that there may be some endogeneity in the relationship between family attachment and depression, endogeneity bias as an interpretation of findings would be harder to reconcile with a modifying effect of neighborhood characteristics on the association between family attachment and suicidal behavior.

individual-level data, roughly 25 cases were collected per neighborhood cluster. The average number of respondents within the 80 target neighborhood clusters was about 50 respondents.

## Sample

We focus in this study on youth from the 12 and 15 years old age cohorts at wave 1. Overall, more than 1,500 respondents between the ages of 11 and 16 participated in the first wave of data collection. Of those, 1,200 participated in the follow-up interviews and answered the suicidal behaviors questions (sample retention rate of approximately 82%).<sup>2</sup>

We use wave 1 data to predict the occurrence of a suicide attempt. Suicide attempt reports are included in the second wave of data collection (suicide attempt reports are not included in the first wave of data collection). However, respondents' suicide attempt reports do not refer solely to the occurrence of suicidal behaviors between the two time-points of data collection, but to adolescents' suicidal behavior during their entire life course. Although temporal ordering with respect to wave 1 and Community Survey measures and the occurrence of suicidal behavior is ambiguous, most such behavior will occur during adolescents' teenage years, as opposed to childhood (Groholt, Ekeberg, and Haldorsen 2006; National Center for Injury Prevention and Control 2006), and, within adolescence, during the later adolescent years (National Center for Health Statistics 2007). Due to missing values on individual-level measures (e.g., parents' education and parental marital status), as well as attrition of nearly 18 percent, our sample includes reports of 990 respondents within 78 neighborhoods.<sup>3</sup>

## Dependent Variable

We rely on adolescents' suicide attempt reports to simultaneously study neighborhood and individual effects on suicidal behaviors. Suicide attempt reports are included in the second wave of the PHDCN survey. Respondents were asked, "Have you ever attempted suicide?" and, "How many times did you attempt suicide?" While 95.5 percent of respondents did not attempt suicide during their life, 4.5 percent (50 respondents) report one or more suicide attempts (47% of these reported one suicide attempt while 53% reported more than one attempt). Of the 50 who attempted suicide, 43 respondents are girls (86.6%) and 7 boys (14.4%).<sup>4</sup> Consistent with prior studies (Brezo et al. 2006), we operationalize adolescents' suicide attempt as a dichotomous variable (attempted suicide = 1, otherwise 0).

Although some would argue that a true test of Durkheim's ideas is best undertaken with reports of completed suicide attempts, we study suicide attempts in this study. Durkheim himself argued that suicides are not necessarily unique outcomes, but rather, are a matter "of degree."

<sup>2</sup>To test whether respondents lost to follow-up were substantially different from those who participated in both waves of data collection, we compared the characteristics of the two groups with respect to this study's background (e.g., age, gender, etc.), psychological (e.g., depression, emotionality, etc.), and social control measures. Descriptive statistics revealed nonsignificant differences between most of the two groups' characteristics. The only difference found was between the two samples' racial compositions: those who did not participate in the follow-up interviews were more likely to be black (mean = .44) or Latino (mean = .35).

<sup>3</sup>Most cases were lost due to missing information in the family socioeconomic status and mothers' education measures. In analyses not shown, we reran our models using imputed versions of a number of variables in order to address the sensitivity of our results to missing data. Results from the listwise deletion and the analyses with imputed variables were similar. We present the listwise deletion results below.

<sup>4</sup>Our data are consistent with prior findings (Brent 1995; Vannatta 1997) suggesting that females attempt suicide more often than males, while males are more likely to complete an attempted suicide than females. Although this pattern suggests the importance of addressing the potential for differential neighborhood-level etiologies of suicidality by gender, we felt that substantial attention to this issue was beyond the scope of the current article. Future research with large-scale data sets that provide measures of both attempts and completions might better investigate the possibility of gendered antecedents of suicidal behavior.

Indeed, findings from more recent research demonstrate that completed suicides and suicide attempts are prevalent in similar populations (Beautrais 2001; Clare and Barraclough 1997; Linehan 1986). Beautrais (2001) and Linehan (1986), for instance, suggest that suicide victims and medically serious suicide attempters share the same biographical, clinical, and psychosocial profile. Thus, in line with these findings, we suggest that attempted and completed suicides represent etiologically similar phenomena (see also Mann 2002).

Measuring suicide attempts rather than completions, however, may result in bias to the extent that “successful” suicide attempts are not included in the outcome variable. Although both successful and unsuccessful suicide attempts are rare, the relative prevalence of the latter is substantially higher (Kessler et al. 2005). Thus, our estimate of the suicide attempt rate may not be markedly biased. Moreover, bias in the estimate of the suicide attempt rate will not necessarily influence the key focus of our analysis—estimating the interactive effects of collective efficacy and family attachment on suicide attempts. Although we cannot directly address the problem of bias due to the select nature of our sample, we estimate models of both any occurrence of a suicide attempt (i.e. logistic models) and the count of suicide attempts (i.e. Poisson models). To the extent that youth who attempt suicide multiple times are more similar to those who are ultimately successful (Joiner 2005), differences in the results of these two modeling approaches may yield some insight into the potential for our key findings to be vulnerable to bias. Results from overdispersed Poisson models (mean individual number of suicide attempts = .14, standard deviation = .97) yielded similar results as those presented below with respect to the interactive effects of collective efficacy and parental attachment and support (results available upon request).<sup>5</sup>

### Independent Variables

A variety of independent variables are included in our analysis capturing respondents’ neighborhood, family, peer, and individual characteristics, including psychological antecedents of suicidal behaviors. All individual-level measures except one (i.e., exposure to family and friends’ suicidal behaviors) were drawn from the first wave of data collection. A detailed description of these measures, as well as the procedures and items that were used to construct these variables, is provided in Table 1. Means and standard deviations for all individual- and neighborhood-level variables are also presented in this table.

## ANALYTIC STRATEGY

In order to capture the particular effect of individual- and structural-level predictors on adolescents’ number of suicide attempts, we use Hierarchical Generalized Linear Models (Raudenbush and Bryk 2002). This methodological approach allows for analysis of individuals’ behaviors within larger units of aggregation (e.g., neighborhoods, schools, organizations). Overall, this procedure addresses two potential biases that may occur when applying ordinary regression techniques to clustered data. First, it allows for more accurate estimates of standard errors when cases are clustered (and potentially correlated) within larger units. Second, it provides estimates of the impact of cross-level interactions between larger unit of aggregation characteristics and individual-level factors. In this work we use two-level logit models (HGLM) to simultaneously estimate individual- and neighborhood level predictors of adolescents’ suicide attempts (Raudenbush and Bryk 2002).

The model can be specified as follows:

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<sup>5</sup>Given the relatively rare nature of suicide attempts, and particularly multiple suicide attempts in our sample, we chose to retain the logit model results in this presentation.



$$\log\left(\frac{\phi_{ij}}{1-\phi_{ij}}\right) = \beta_{0j} + \beta_{(FamAtt)_j} + \sum_{q=2}^Q \beta_{qj} X_{qij} \quad (1)$$

where  $\beta_{0j}$  is the intercept,  $X_{qij}$  is the value of covariate  $q$  associated with respondent  $i$  in neighborhood  $j$ , and  $\beta_q$  is the partial fixed effect of that covariate on the log-odds of suicide attempt. The level-two model may be denoted as

$$\beta_{0j} = \gamma_{00} + \sum_{s=1}^S \gamma_s W_{sj} + u_{0j} \quad u_{0j} \sim N(0, \tau_{00}) \quad (2)$$

$$\begin{aligned} \beta_{(FamAtt)_j} &= \gamma_{10} + \gamma_{11} (CollEff)_j + u_{1j} \\ u_{1j} &\sim N(0, \tau_{FamAtt}) \end{aligned} \quad (3)$$

where  $\gamma_{00}$  is the intercept and  $\gamma_s$  are the level-two coefficients for the effects of  $s$  covariates  $W$  on the log-odds of suicide attempt ( $u_{0j}$  is the neighborhood-level error term, with a normal distribution and variance of  $\tau_{00}$ ). To test for the presence of a cross-level interaction between collective efficacy and family attachment, we allow the coefficient for family attachment and support to vary as a function of collective efficacy and a random effect (with all other level-one coefficients fixed).<sup>6</sup> All predictors included in our models are grand-mean centered.

## RESULTS

### Descriptive Statistics

The prevalence of any suicide attempts in the sample is 5 percent. With regard to background characteristics, results indicate that the sample has a balanced gender composition and a heterogeneous racial composition. The typical respondent was nearly 14 years old in the first wave of data collection (15.5 in the second wave) and had two siblings. Most respondents (54%) lived with two married parents and had mothers with some high school education (specifically, 23.9% of the mothers had less than high school education, while 76.1% had some high school or higher education).

### Adolescents' Suicide Attempts: Individual- and Neighborhood-level Predictors

Table 2 presents results from the multilevel logit analysis. First, in order to gauge the magnitude of variation between neighborhoods in adolescent suicide attempts, we estimate an unconditional model with no predictors at either level (analysis not shown). Examination of this model's variance component ( $\tau_{00} = .247, p < .05$ ) reveals significant variation in adolescents' suicide attempts across neighborhoods.

Next, we estimate the effect of individual-level demographic predictors on the occurrence of a suicide attempt (while allowing the intercept to vary across neighborhoods). Model 1 presents results from this analysis. Examination of the first model reveals that, consistent with prior research, girls and older adolescents are more likely to attempt suicide. Latino

<sup>6</sup>Similar results were obtained when the family attachment slope was assumed to vary nonrandomly as a function of collective efficacy (i.e., with no random slope included).

youth are also more likely to attempt suicide. Finally, and in line with our expectation, length of family residence is negatively associated with adolescents' suicide attempts. The effects of number of siblings, living in a two-parent household, and mother's level of education are not significant in this model.

In model 2 we incorporate a series of mental health predictors and a substance use measure and estimate their effects on suicide attempts. The effects of female, age, and Latino ethnicity remain significant in model 2. Length of family residence also carries a significant effect. Examination of coefficients for the mental health measures reveals that depression is positively and significantly associated with suicide attempts. The effects of the other mental health measures are insignificant in this model.

Next, we incorporate exposure to suicidal behavior and parent attachment and support predictors in model 3. Note that the significant effects of all predictors reported in model 2 remain significant and similar in magnitude in this model. Investigation of the social control effect reveals that family attachment significantly reduces adolescents' suicide attempts. Specifically, a one standard deviation increase in the family attachment and support scale reduces the probability of suicide attempts by more than 35 percent.<sup>7</sup> Finally, the coefficient for exposure to suicidal behavior is not significant in this model.

In model 1 of Table 3 we introduce the neighborhood measures. None of the neighborhood-level predictors examined is significant in this model. Investigation of the residual variance component for this model's intercept indicates that significant variation ( $p < .001$ ) remains. This finding suggests that even when all individual-level measures and neighborhood structural predictors are included in the model, neighborhood may still be relevant when studying adolescents' suicide attempts. With respect to individual-level covariates, note that the effects of most predictors remain, as reported in model 3.

Next, we incorporate collective efficacy as an additional neighborhood-level predictor (model 2). The average effect of collective efficacy is not significant, and the effects of structural and individual-level predictors on suicide attempts remain essentially unchanged. Nevertheless, the effect of African American race becomes significant and positive in this model.

Finally, we examine the hypothesis of a cross-level interactive effect between collective efficacy and family attachment and support. First, in analyses not shown, we test the hypothesis that the effect of family attachment and support varies across neighborhoods by allowing the family attachment and support slope to vary randomly. Results from this model indicate highly significant slope variation ( $\tau_{FamAtt} = .002, p < .001$ ). Next, in model 3, we allow the coefficient of family attachment and support to vary as a function of collective efficacy and a random effect. Consistent with our early models, note that none of the neighborhood-level effects are significant in this model. With regard to individual-level predictors, all significant effects reported in model 2 remain significant and in the same directions. However, including the interaction between collective efficacy and family attachment reveals a significant cross-level interaction ( $b = -.186, p < .05$ ). Specifically, collective efficacy interacts with family attachment and support such that, as collective efficacy increases, the protective (or negative) effect of family attachment also increases in magnitude, further reducing the likelihood of a suicide attempt.

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<sup>7</sup>The measure of family attachment and support was negatively skewed (i.e., most respondents reported relatively high levels of attachment to parents). We tested the effects of alternative constructions of this measure in order to assess the sensitivity of the results to the skewness of the measure. A categorical version of the measure (combining values at the low end of parental attachment) and a logged version yielded comparable results in models of both the independent and cross-level interactive effects of family attachment.

To better understand this cross-level interaction we plot the predicted probability of suicide attempt across levels of family attachment and support (from the 25th to the 75th percentiles on the family attachment scale) at high and low levels of collective efficacy (1 standard deviation above and below the mean) in Figure 1 (holding other covariates at their sample means). At low levels of collective efficacy, the effect of family attachment on attempting suicide is not significant.<sup>8</sup> In contrast, the slope for family attachment is both statistically significant and negative when collective efficacy is high: At the 25th percentile on the family attachment scale, the predicted probability of attempting suicide is .07; in contrast, at the 75th percentile, the probability of attempting suicide is dramatically lower, at .02. Thus collective efficacy and family attachment and support interact to produce nontrivial differences in the effects of family attachment on the likelihood of a suicide attempt.

## DISCUSSION

In the current analysis we examine the effect of mental health, family and neighborhood characteristics, and social control mechanisms on the probability of adolescent attempted suicide. We draw on Durkheim's predictions that suicide in modern societies is a result of individuals' lack of integration in society as well as the inability of society to regulate its members (Durkheim [1897] 1951). We employ a contemporary conceptualization of social control rooted in collective efficacy theory (Sampson et al. 1997) and hypothesize that low levels of intergenerationally-oriented collective efficacy within neighborhoods are associated with more frequent suicide attempts among adolescents. As a source of integration and normative regulation, we hypothesize that family attachment and support will also reduce suicide attempts, and that the beneficial effect of family attachment will be more pronounced in high collective efficacy communities. This analysis constitutes one of the first attempts to incorporate micro social control and mental health predictors of suicide in conjunction with neighborhood-level structural and social process constructs.

Overall, the analyses support the notion that suicide and suicide attempts should be studied while incorporating both micro and macro predictors. More specifically, we show that adolescents' likelihood of suicide attempt varies between neighborhoods and suggests that, in addition to the typical focus on demographic predictors of suicide (i.e., race and age), a thorough investigation should take into account this neighborhood-level variation as well. Situating neighborhoods as consequential contexts for the establishment of social control, we highlight neighborhood collective efficacy as a relevant source of adolescent regulation. In line with prior research findings regarding the effect of collective efficacy on more private behaviors of neighborhood dwellers (Browning 2002; Browning et al. 2005) we demonstrate that collective efficacy conditions the protective effects of family attachment and support on suicidal behaviors.

As has been reported in several previous studies (Eskin 1995), we find that the effect of family attachment and support is influential in protecting against adolescents' suicidal behaviors. As reported above, adolescents with high levels of parental attachment are at lower risk of suicide attempt. However, our findings also indicate that living within a high collective efficacy environment enhances the beneficial effect of parental attachment in reducing adolescents' suicide attempts. As noted by Hirschi (1969), "even when not present, parents can indirectly control their children if they are psychologically present when the temptation to commit a crime appears. If, in the situation of temptation, no thought is given to parental reaction, the child is to this extent free to commit the act" (p. 88). Living in a neighborhood with high collective efficacy and where intergenerational contacts are

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<sup>8</sup>Note that relatively few adolescents reported low family attachment. Thus, the predicted probabilities of suicide attempts pertain to very few actual cases for this group.

widespread, and normative orientations regarding youth behavior and support are strong, the psychological presence of the parent is likely to exert more powerful influence on behavior. Moreover, the neighborhood context may introduce additional people (i.e., close neighbors and parents of close friends) to whom adolescents may develop strong ties, promoting feelings of belonging beyond those cultivated within the family. Importantly, though, these ties do not substitute for parental bonds. The consistency of normative orientations between parents and community contexts reinforces the effects of the former on children's behaviors; as such, neighborhood collective efficacy enhances the protective effect of family attachment. These findings point to the need for additional research on the role of social context in shaping the impact of family processes on youth development more broadly.

This analysis reveals some unexpected findings with respect to the association between individual and neighborhood SES characteristics and adolescents' suicide attempts. In particular, findings suggest that neighborhood demographic and structural characteristics (i.e., concentrated poverty, immigrant concentration, and residential stability) are insignificant predictors of adolescents' suicide attempts. Nevertheless, the significant intercept variance component reported in models that are fully conditional at the individual level (i.e., including all individual-level predictors) suggests that neighborhood context likely accounts for some variation in adolescents' suicide attempts. While we find that none of the classical social disorganization variables are significantly associated with adolescents' suicidal behaviors, future studies may benefit from closer investigation of the effects of affluence on suicide attempts. According to Offer (2006), affluence and mental disorders have risen together during the last three decades around the globe. Studying the suicide rates in 30 countries, Jungeilges and Kirchgassner (2002) find that suicide is positively and significantly correlated with the level of growth and the rate of income per head. In line with these studies, one may hypothesize that similar relationships exist between suicide and economic welfare in the context of neighborhoods as well.

At the individual level, our analysis reveals support for the vast body of research suggesting that poor mental health, particularly depression, is significantly associated with suicidal behaviors. We acknowledge limitations in our measure of depression: It does not adequately capture neurological deficits that contribute to suicidal behaviors, nor does it distinguish between depression and major depression, the latter of which is more likely to result in suicide attempts (Angst, Angst, and Stassen 1999). Nevertheless, the observed effect of depression is consistent, substantial, and robust in our model. Due to data limitations, we also do not control for specific diagnoses, such as bipolar disorder and schizophrenia. Both are associated with depression and are consistently reported as risk factors for suicide (Hawton et al. 2005; Jamison 2000). Future studies should address this limitation.

Although this study is one of the few multilevel investigations of the etiology of suicidal behaviors, we were unable to avoid a number of additional limitations in its execution. First, causal ordering is an issue in our analysis of suicide attempts; different assumptions about causal ordering may point to alternative interpretations of our findings. Respondents' suicide attempt reports from the PHDCN do not refer solely to the occurrence of suicidal behaviors between the two time points of data collection, but to adolescents' frequency of suicide attempts during their entire life course. Since the probability of suicidal behavior increases significantly during adolescence—and is virtually nonexistent during childhood (National Center for Injury Prevention and Control 2006)—it is plausible that temporal ordering problems are more pronounced for older adolescents. Although we find no evidence of age variation in the pattern of association observed in these models, we nevertheless acknowledge the need for more precise data on the timing of suicide attempts.

Second, we cannot extend our findings to suicide completion among adolescents. However, some scholars demonstrate that successful suicides and suicide attempts form two overlapping populations, such that the “risk factors and life processes that lead to suicide are similarly evident for those making serious suicide attempts” (Beautrais 2001:844). Third, we situate our work in the context of neighborhoods, yet do not consider the possible effects of other contexts that play significant roles through adolescence (for instance, school). In line with the developmental notion that the influence of key social contexts may change over the adolescent life course, future analyses should also examine the joint, and potentially changing, relevance of neighborhoods, schools, and peer groups across age and their role in protecting against suicidal behaviors. Moreover, more precise measures of neighborhood could be employed to capture the relevant context for adolescents (Grannis 1998). Finally, although we acknowledge that differences in suicide attempts and completions by gender are an important issue in studying suicidal behavior and may suggest differences in the etiology of suicidality by gender, our data did not allow for a gender-disaggregated assessment of the multilevel hypotheses considered here.

In conclusion, and despite these limitations, our results indicate that family attachment and support reduces the individual-level probability of suicide attempt, especially when the family resides within a high collective efficacy neighborhood. We believe that our findings lay the groundwork for further theoretical and empirical attention to the multilevel context of adolescent suicidality. Specifically, we call for further investigation into the potential for context to condition the role of individual characteristics in predicting adolescent mental health. Modifying Durkheim’s assumption that social facts cannot be explained by psychological facts, we suggest that social facts can be integrated into more complex explanations of individual-level phenomena.

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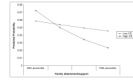
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## Biographies

**David Maimon** is an Assistant Professor in the Department of Criminology and Criminal Justice at the University of Maryland. His research interests include theories of human behavior, deviance, community and crime, and quantitative methods. His current research focuses on the consequences of neighborhood processes on behavioral and psychological outcomes, time use and the life course, suicide and multilevel statistical models.

**Christopher R. Browning** is Professor in the Department of Sociology at Ohio State University. His research interests include the causes and consequences of community social organization; the neighborhood context of crime, risk behavior, and health; the long-term effects of maltreatment during childhood; and multilevel statistical models. He is currently Principal Investigator on a 3-year grant from the National Institute of Child Health and Human Development to investigate the influence of neighborhood social processes on adolescent psychological and behavioral health.

**Jeanne Brooks-Gunn** is the Virginia and Leonard Marx Professor of Child Development and Education at Teachers College and the College of Physicians and Surgeons at Columbia University and she directs the National Center for Children and Families ([www.policyforchildren.org](http://www.policyforchildren.org)). She is interested in factors that contribute to both positive and negative outcomes across childhood, adolescence, and adulthood, with a particular focus on key social and biological transitions over the life course. She designs and evaluates intervention programs for children and parents (Early Head Start, Infant Health and Development Program, Head Start Quality Program). Other large-scale longitudinal studies include the Fragile Families and Child Well-being Study and the Project on Human Development in Chicago Neighborhoods (co-PI of both). She is the author of 4 books and over 500 publications. She has been elected to the Institute of Medicine of the National Academies and she has received lifetime achievement awards from the Society for Research in Child Development, American Academy of Political and Social Science, American Psychological Society, American Psychological Association, and Society for Research on Adolescence.



**Figure 1.**  
Predicted Probability of Attempting Suicide by Family Attachment and Neighborhood  
Collective Efficacy (by Age 16)

Table 1

Definitions, Means and Standard Deviation of Measures Included in Analysis ( $N = 990$ )

Variable	Definition	Mean	SD
<i>Individual-level measures</i>			
Female	Dummy variable indicating respondent is female (1 = female)	.52	.50
Age	Measures respondent's age (in years) at the time of the initial in-home survey (wave 1)	13.5	1.52
Hispanic	Dummy variable indicating respondent is of Hispanic descent (1 = Hispanic)	.46	.50
Black	Dummy variable indicating respondent is of African American descent (1 = black)	.36	.48
Two-parent household	Dummy variable indicating whether respondent lives with two married parents (1 = lives with two married parents)	.54	.50
Mother's education	Indicates the respondent's mother's highest education (less than high school = 1; some high school = 2; finished high school = 3, more than high school = 4, bachelor's degree or more = 5) <sup>a</sup>	2.78	1.35
Number of siblings	Indicates the number of siblings under age 19 living within the same household	2.09	1.61
Length of family residence	Continuous measure indicating respondent's length of residence with family (in years) at current address	5.82	4.63
Depression	A 16-item scale measuring the extent of respondent's depressive behaviors based on the widely used Child Behavior Check list (Achenbach 1991). Respondents were asked for their level of agreement with statements such as, "I feel lonely"; "I am too fearful or anxious"; "I feel worthless or inferior"; "I cry a lot"; "I feel that no one loves me"; and, "I feel depressed." Response score ranges from 0 (not true) to 2 (very or often true). This scale is the sum of item responses (alpha = .79).	8.07	4.84
Emotionality	A five-item scale measuring the respondent's level of emotionality (Buss and Plomin 1984). Using a score ranging from 1 (uncharacteristic) to 5 (characteristic), respondents' parents were asked to indicate how statements such as, "often fusses and cries"; "tends to be somewhat emotional"; and, "sometimes does crazy things to be different" characterize their child's behaviors. The scale is the average of item responses (alpha = .71).	2.70	1.08
Impulsivity	This 20-item scale taps individual predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions (Buss and Plomin 1984). Respondents' parents were asked to indicate how statements such as, "often acts on spur of the moment"; "seeks new and exciting experiences"; and "tends to hop from one interest to another" characterize their child's behaviors. Scores for this scale range from 1 to 5. The scale is the average of item responses (alpha = .73).	2.64	.61
Sociability	This measure is the mean of a nine-item scale capturing the extent of respondent's social inclinations and skills (Buss and Plomin 1984). Respondents' parents were asked to indicate how statements such as, "likes to be with people" and "makes friends easily" characterize their child. Responses range from 1 (uncharacteristic) to 5 (characteristic). The scale is the average of item responses (alpha = .67).	3.69	.74
Substance abuse	This measure taps respondents' dependence on alcohol and drugs. Respondents were asked to report if they smoked cigarettes, got drunk, and smoked marijuana during the last 12 months. Response categories are dichotomous (0 = no; 1 = yes). This scale is the sum of these three items (alpha = .72).	.49	.87
Exposure to suicidal behaviors (w2)	A dichotomous variable indicating whether any of the respondent's family members or friends have ever attempted suicide (1 = affirmative response; 0 otherwise).	.09	.29
Family attachment and support	Measures the extent to which respondents' family members provide emotional and social support (Browning et al 2005). This six-item scale is composed of the following items: "I know my family will always be there for me"; "sometimes I'm not sure I can rely on family" (reverse-coded); "my family tell me they think I am valuable"; "my family has confidence in me"; "my family helps me find solutions to problems"; and, "I know family will always stand by me." Response scores are 1 (not true), 2 (somewhat true), and 3 (very true). The scale is a standardized average of the item responses (alpha=.72).	.00	1.00
<i>Neighborhood measures<sup>b</sup></i>			
Concentrated poverty	This measure is the first principal component of the percentages of residents below the poverty line, receiving public assistance, unemployed, and households headed by a female (Sampson et al. 1997).	-.02	.91
Immigrant concentration	This measure is composed of the percentages of Latino and foreign-born individuals living within the neighborhood (Sampson et al. 1997).	.36	1.04



Variable	Definition	Mean	SD
Residential stability	This measure is composed of the percentages of residents living in the same house as in 1985 and the housing occupied by owners (Sampson et al 1997). <sup>c</sup>	-.25	.99
Collective efficacy	This measure taps scales of social cohesion and intergenerational closure and informal social control in the neighborhood (Browning et al 2005). The social cohesion scale is composed of participants in the community survey agreeing to the following statements: “people around here are willing to help their neighbors”; “this is a close knit neighborhood”; “people in this neighborhood can be trusted”; “people in this neighborhood generally don’t get along with each other” (reverse-coded); and “people in this neighborhood do not share the same values” (reverse-coded). Similarly, the intergenerational closure and informal social control scale is composed of Chicago residents’ agreement with the following statements: “people in this neighborhood know their children’s friends”; “adults in this neighborhood know who the local children are”; “there are adults in this neighborhoods that children can look up to”; “parents in this neighborhood generally know each other”; and “you can count on adults in this neighborhood to watch out that children are safe and do not get in trouble” (Browning et al 2005). Because the two scales are highly correlated, <sup>d</sup> we take a similar approach to that suggested by Sampson and colleagues (1997) and combine the scale into a single measure of intergenerational-oriented collective efficacy using a three-level rating scale analysis. <sup>e</sup> The average three-level reliability of the combined scale was .72. <sup>f</sup>	-.05	1.11

<sup>a</sup>In analyses not shown, we represented mother’s education with a series of dummy variables. Since the effect of these variables looked approximately linear we operationalize mother’s education as a linear measure in the models presented below.

<sup>b</sup>All neighborhood demographic measures are drawn from the 1990 decennial Census while items for the collective efficacy measures are drawn from the PHDCN-CS.

<sup>c</sup>Little evidence of multicollinearity between neighborhood-level constructs was observed in examinations of variance inflation factors. While the mean VIF = 1.73, the vif values of each of our neighborhood-level measures do not exceed the value of 4 (the maximum observed value).

<sup>d</sup>Both subscales performed in the same way as the combined scale in our model.

<sup>e</sup>See Raudenbush and Sampson (1999) for additional technical discussion of three-level item response models and Browning, Leventhal, and Brooks-Gunn (2005) for a detailed discussion of the measure’s construction.

<sup>f</sup>Reliability in three-level models is a function of the number of level one items, the number of level two cases, and the relative degree of variability in the collective efficacy scale across neighborhoods (Raudenbush and Bryk 2002).

**Table 2**  
Adolescents' Number of Suicide Attempts Regressed on Individual-level Predictors (N = 990)

	Model 1		Model 2		Model 3	
	Coefficient (SE)	Odds Ratio	Coefficient (SE)	Odds Ratio	Coefficient (SE)	Odds Ratio
Intercept	-3.82*** (.266)	.022	-4.04*** (.271)	.018	-4.12*** (.309)	.016
Female	1.95*** (.436)	6.93	1.50*** (.441)	4.48	1.38** (.454)	3.98
Age	.569*** (.126)	1.76	.444** (.143)	1.56	.418*** (.149)	1.52
African American	.828 (.514)	2.28	1.07 (.611)	2.91	1.26 (.702)	3.53
Latino	1.08* (.491)	2.93	.871* (.505)	2.39	.976* (.583)	2.65
Two-parent household	-.027 (.312)	.973	.120 (.340)	1.12	.201 (.349)	1.22
Mother's education	.163 (.130)	1.18	.142 (.128)	1.15	.210 (.142)	1.23
Number of siblings	-.102 (.103)	.903	-.094 (.107)	.910	-.101 (.112)	.903
Length of family residence	-.076* (.037)	.926	-.071* (.036)	.931	-.084* (.039)	.919
Depression	—	—	.143*** (.031)	1.15	.131*** (.032)	1.14
Emotionality	—	—	.018 (.163)	1.02	-.014 (.163)	.985
Impulsivity	—	—	.100 (.325)	1.10	-.123 (.345)	.884
Sociability	—	—	-.101 (.205)	.904	-.084 (.216)	.918
Substance abuse	—	—	.283 (.214)	1.33	.241 (.210)	1.27
Parent attachment and support	—	—	—	—	-.432*** (.173)	.648
Exposure to suicidal behavior	—	—	—	—	.050 (.463)	1.05
t <sub>0</sub>	.067***	—	.101***	—	.057***	—
df	77	77	77	77	77	77

\* p < .05;

\*\* p < .01;

\*\*\* p < .001 (two-tailed tests)

**Table 3** Adolescents' Number of Suicide Attempts Regressed on Collective Efficacy, Individual- and Neighborhood-level Predictors (*N* = 990)

	Model 1			Model 2			Model 3		
	Coefficient (SE)	Odds Ratio	Odds Ratio	Coefficient (SE)	Odds Ratio	Odds Ratio	Coefficient (SE)	Odds Ratio	Odds Ratio
Intercept	-4.10*** (.310)	.017	.016	-4.12*** (.328)	.016	.016	-4.11*** (.300)	.016	.016
Female	1.36** (.453)	3.91	3.86	1.35** (.405)	3.86	3.86	1.30** (.392)	3.67	3.67
Age	.421** (.144)	1.52	1.53	.427* (.143)	1.53	1.53	.428** (.135)	1.53	1.53
African American	1.44 (.837)	4.24	5.05	1.62* (.850)	4.24	5.05	1.70* (.841)	5.49	5.49
Latino	1.12* (.592)	3.06	3.21	1.17* (.591)	3.06	3.21	1.24* (.488)	3.45	3.45
Two-parent house-hold	.191 (.339)	1.21	1.19	.171 (.340)	1.21	1.19	.183 (.323)	1.20	1.20
Mother's education	.196 (.137)	1.21	1.22	.198 (.137)	1.21	1.22	.219* (.125)	1.24	1.24
Number of siblings	-.091 (.112)	.912	.917	-.086 (.111)	.912	.917	-.080 (.105)	.923	.923
Length of family residence	-.079* (.039)	.924	.922	-.080* (.039)	.924	.922	-.070* (.036)	.932	.932
Depression	.132*** (.032)	1.14	1.14	.133*** (.033)	1.14	1.14	.133*** (.030)	1.14	1.14
Emotionality	-.027 (.156)	.972	.988	-.011 (.152)	.972	.988	-.000 (.149)	.999	.999
Impulsivity	-.126 (.336)	.881	.856	-.154 (.338)	.881	.856	-.179 (.324)	.836	.836
Sociability	-.083(.219)	.919	.929	-.073 (.221)	.919	.929	-.079 (.205)	.923	.923
Substance abuse	.221(.213)	1.25	1.23	.209 (.212)	1.25	1.23	.205 (.204)	1.23	1.23
Parent attachment and support	-.431** (.173)	.649	.646	-.436* (.175)	.649	.646	-.439* (.171)	.644	.644
Exposure to suicidal behavior	.084 (.460)	1.09	1.09	.087 (.465)	1.09	1.09	.076 (.446)	1.08	1.08
<i>Neighborhood measures</i>									
Concentrated poverty	-.181 (.257)	.833	.844	-.168 (.253)	.833	.844	-.192 (.247)	.824	.824
Immigrant concentration	-.061 (.306)	.940	1.03	.031 (.304)	.940	1.03	.032 (.284)	1.03	1.03
Residential stability	-.047(.234)	.953	.900	-.104 (.225)	.953	.900	-.093 (.212)	.910	.910
Collective efficacy	—	—	1.18	.173 (.147)	—	1.18	.005 (.165)	1.00	1.00
Collective efficacy × Family attachment and support	—	—	—	—	—	—	-.186* (.100)	.829	.829
<i>t</i> <sub>0</sub>	.146***			.157***			.138***		
df	74			73			71		
<i>t</i> <sub>joint_ata</sub>	—			—			.032***		

	Model 1		Model 2		Model 3	
	Coefficient (SE)	Odds Ratio	Coefficient (SE)	Odds Ratio	Coefficient (SE)	Odds Ratio
df	—		—		—	74

\*  $p < .05$ ;

\*\*  $p < .01$ ;

\*\*\*  $p < .001$  (two-tailed tests)