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Targeting youth at risk for gang involvement: Validation of a gang risk assessment to support individualized secondary prevention☆

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ABSTRACT

Objective/Purpose: A major challenge in economically marginalized neighborhoods across the United States and around the world is the proliferation of local street gangs and the violence they perpetuate. While estimates vary from place to place, in the United States approximately 10% to 19% of youth between the ages of 12 and 16 are likely to join a local street gang in these high-risk areas. While a substantial proportion of those who join a gang drop out relatively quickly (within a year or so), others remain involved over several years. Prolonged involvement in a street gang frequently results in violent injury or death among gang-involved youth and among innocent victims. Communities and families facing these problems are looking for ways to discourage gang involvement before it starts.

Methods: Here we report a test of the prospective validity of an assessment that supports concentrated prevention efforts focused on the youth most likely to join a gang. This approach, called secondary gang prevention, works intensively to remediate influences that motivate high-risk youth to join a neighborhood gang. The prospective validity of the Gang Risk of Entry Factors (GREF) assessment was tested over a 12 to 18 month period (baseline to retest) in a high-risk sample of 11 to 16 year old youth in Los Angeles County.

Results: The findings confirm the assessment's effectiveness in prospectively identifying the youth most likely to join a gang within impacted communities. In the study sample, 100% of the boys who reported current gang membership, 81% of boys who report former gang membership, and 74% of the boys who reported hanging out with the gang at the posttest had been identified as high-risk 12 to 18 months earlier on the baseline assessment. All but one of the 14 girls in the study who reported any gang involvement (including just hanging out) on the posttest had been assessed as high-risk on the baseline interview.

Conclusions: The findings confirm the assessment's effectiveness in prospectively identifying the youth most likely to join a gang within impacted communities.

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1. Introduction

A recent report from the National Institute of Justice stresses the need to strengthen gang prevention strategies across the United States (Simon, Ritter, and Mahendra, 2013). In this report, Howell (2013) estimates that there has been a 35% increase in the number of youth street gangs nationwide between 2002 and 2010. In particular, Howell highlights the need "more intensive or selected prevention programs" to reach youth who are most at risk of gang involvement (7–8). In the same report, Leap (2013) stresses the importance of community-based strategies. She argues that gangs are often thought of as a group separate from their community. As a result of this thinking, many programs that address gang problems have tended to be deterrence-heavy attempts to move gangs out of the community (105). Instead, Leap argues that more attention should be paid to strategies that help prevent children from joining gangs in the first place – strategies implemented right in their own communities.

Access to general prevention and youth development programs that are open to all interested youth is not uncommon in most neighborhoods, but this level of prevention alone is often not enough to prevent high-risk youth from joining a gang. Primary prevention generally lacks the intensity and focus needed to address the needs of high-risk youth (see Esbensen, Osgood, Peterson, Taylor, and Carson, 2013). Anecdotal evidence suggests that youth who are most likely to join a gang may choose not to engage in available primary prevention programs, and when high-risk youth do engage, their attendance is often not sustained. Further, general prevention providers should consider the

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pros and cons of including young clients in primary prevention settings who are already moving toward gang involvement or appear to be active in this regard.

Several researchers have documented concerns about the negative influence aggressive or antisocial youth can have in contexts where they freely interact with less aggressive youth, a dynamic called deviancy training (Dishion and Dodge, 2005; Dishion, Eddy, Haas, Li, and Spraklen, 1997; Dishion, McCord, and Poulin, 1999; Dodge, Dishion, and Lansford, 2006; Hennigan, Kolnick, Tian, Maxson, and Poplawski, 2010; Piehler and Dishion, 2007). Some researchers have demonstrated that discrepancy-proportional peer influence, defined by controlled contexts where a majority of less aggressive youth can be effective in highly structured group settings (see Boxer, Guerra, Huesmann, & Morales, 2005), however this dynamic appears to be rare in naturally-occurring youth group settings. More typical are situations where high-risk youth are free to interact with other youth without structure or supervision. If programs group high risk youth together, informal interactions are likely to encourage deviant behavior (e.g., negative influence through exposure to talk about the powerful or exciting aspects of being in a gang, with little or no recognition of the downside).

We argue here that successful prevention of gang-joining is important because once a youth becomes invested in a gang, the consequences of gang involvement often become serious and not easily reversed. Augustyn, Thornberry, and Krohn (2014) documented both the immediate negative outcomes associated with joining gangs in adolescence as well as the implications this has over the life course. They report that specific negative outcomes prevalent among youth who join gangs in adolescence include dropping out of high school, teenage cohabitation, and teenage parenthood. Their research confirms that these premature transitions to adulthood coupled with participation in gang-related events during adolescence perpetuate a pattern of maltreatment on their own children years later. Thornberry and Henry (2013) report that the odds are high that victims of adolescent maltreatment in one generation often perpetuate the practice of maltreatment on to the next. Thus adolescent gang involvement may trigger and sustain cycles of dysfunction and maltreatment over generations.

Klein and Maxson (2006) suggest that successful secondary gang prevention requires: a) determining the right locations for secondary prevention programs within or very near the neighborhoods with active street gangs; b) focusing on the array of behaviors, attitudes and social contexts related to gang joining; and c) identifying and engaging those individuals most likely to join a street gang, based on empirical knowledge. Street gangs are typically found in communities with social and economic deficits (e.g., poverty, disorder, violence and unemployment) that nurture and sustain gang joining. These communities are challenged by the powerful intergroup dynamics that play out within and especially between neighborhoods (Papachristos, Hureau, and Braga, 2013). Inter-gang competition sustains threats and violence which reinforce and stimulate participation (Decker and van Winkle, 1996; Klein, 1995). Setting up more intensive programs in neighborhoods like these presents significant challenges for local social service agencies, schools and law enforcement. However, it is precisely in or near these neighborhoods that secondary prevention programs focused intensively on individual clients (and their families) are most needed.

Even in gang-impacted neighborhoods many youth who participate in delinquent and criminal behavior are not – and do not become – involved in street gangs. Joining and participating in a street gang involves dynamic processes that extend beyond engagement in crime and delinquency alone. Youth in the process of joining a street gang are subject to group influences that motivate and sustain activities well beyond what an individual might otherwise chose to do outside of the gang context. In one study, for example, Hennigan and Sloane (2013) found that level of participation in crime and violence among gang-involved youth in their study was mediated by the strength of identification with the gang (gang identity) regardless of their perception of the likelihood of getting caught and punished. Non-gang youth from the same neighborhoods were deterred from involvement in crime, apparently due in part to their perceptions of the likelihood of getting caught and punished – but this was not a deterrent for the gang-involved youth. In short, a gang member's cognitive and emotional bonds with the gang trump his or her own individual proclivities (Decker, 1996; Decker and van Winkle, 1996; Hennigan and Spanovic, 2012; Klein and Crawford, 1967; Pyrooz, Decker, and Webb, 2014; Vigil, 1988, 2002).

Esbensen et al. compared levels of violence in a large sample of youth involved in street gangs to a sample of non-gang youth who were also involved in violent activities (Esbensen, Peterson, Taylor, and Freng, 2009). They conclude that it takes a greater push for youth to become involved in a street gang than to become involved in violence in general. Their data suggest that gang-involved youth have a greater number of risky attitudes and behaviors overall. Their analyses show that certain risk factors are more strongly related to violence among gang members than among violent non-gang youth (i.e., guilt neutralization and commitment to negative peers). Major reviews of the literature on gang-related risk factors (e.g., Klein and Maxson, 2006; Krohn and Thornberry, 2008) make clear that it is an accumulation of multiple risks that distinguish those involved in gangs from similarly-situated youth. These findings suggest that secondary prevention programs can concentrate on reducing gang joining by focusing on the subset of youth with an accumulation of multiple risks that have been associated with joining a gang. However, there has been no reliable method to determine which youth exhibit this accumulation of risks.

Lipsey's (2009) meta-analysis confirmed that program failures have been associated with an inability to actually enroll youth with high risks. It is not unusual to find that well-placed and well-intentioned programs have failed to reach the youth who need help the most. For example, Melde, Gavazzi, McGarrell, and Bynum (2011) document that the common practice of enrolling youth based solely on referrals, even those from high-risk areas, often misses the youth most in need. Reliably identifying high-risk youth has presented unexpected challenges.

This paper reports a test of the prospective validity of the recently developed Gang Risk of Entry Factors (GREF) assessment that is designed specifically to identify high-risk youth, prone to joining a street gang.[1] The purpose of the assessment is to enable secondary gang prevention programs to concentrate their resources on those high-risk and hard-to-reach youth who are most likely to join local gangs. This is especially important because even in communities with a significant gang presence, a relatively small percentage of youth actually become actively affiliated with a gang. While estimates of the prevalence of gang joining vary from one study to the next, Klein and Maxson's (2006) review suggests that somewhere around 10% to 19% (averaged across sex) of youth in areas with a significant gang presence may succumb to the temptations or pressures to join a gang during adolescence. Gang joining is most prevalent between the ages of 12 and 16 (Esbensen et al., 2009; Klein and Maxson, 2006; Pyrooz and Sweeten, 2015). Secondary prevention programs are specifically designed to recruit and intervene with high-risk youth prior to gang joining, roughly between the ages of 10 and 16. The purpose of the GREF assessment is to allow programs to work intensively with the subset of youth who are most likely to join a street gang. The GREF assessment includes eight key risk factors and a self-report delinquency scale to identify youth with risk profiles that match the profiles of youth who joined street gangs across multiple longitudinal studies reviewed by Klein and Maxson (2006) and Krohn and Thornberry (2008).

The initial processes of developing and pilot testing the GREF assessment over a two-year period are reported elsewhere (Hennigan, Maxson, Sloane, Kolnick, and Vindel, 2014). The nine factors included

[1] The GREF Assessment is called the YSET (Youth Services Eligibility Tool) in the context of the Los Angeles Gang Reduction and Youth Development (GRYD) Program. The assessment was developed and its concurrent validity has been tested in the context of the Los Angeles GRYD Program over a 3 to 4 year period. See Hennigan et al. (2014) for details.

on the GREF assessment are described in the Appendix A, with citations for the empirical support and the source of each scale.

This paper reports the results of efforts to test the prospective validity of the GREF assessment by answering key questions about the efficacy of the assessment including: 1) how successful the assessment is in identifying youth who will become associated with a street gang over the subsequent 12 to 18 months; 2) what percentage of youth identified as high risk for gang joining actually do join a gang over this time (in the absence of a program); and 3) how many youth identified as low risk join a gang over this time? The assessment is intended to both increase the efficiency of the secondary prevention programs by reducing the number of youth involved in services (i.e., reducing the inefficiency of serving low risk youth who don't need gang prevention services) without missing the youth who are likely to join a gang, and to use the information accessed to help guide specific and intensive work with each client (and his or her family).

2. Methods

2.1. Initial recruitment and informed consent

Recruitment of study participants was based on networking with probation officers in areas of Los Angeles County that experience high levels of gang crime, including parts of Long Beach, Rio Honda, the San Fernando Valley and the San Gabriel Valley (excluding areas within the Los Angeles city limits where secondary prevention programs were currently in operation).

The study catchment areas were chosen with the help of the county probation staff who were familiar with neighborhoods where street gangs are prevalent.[2] Youth were referred to our team in three ways. Some were referred by school-based probation officers (27%). Some were recruited at the probation office after the youth and parent met with their probation officer (60%), and others were referred to us by a participating youth or his or her parent (13%). In each situation, our interviewers described the opportunity to the youth and parents, gave them general information about the purpose of the study, and asked if they would be interested in hearing more. For those who were interested, an appointment was set to meet at their home or other suitable location. Detailed information and informed consent was obtained during the home visit prior to the study interviews. Both parental and youth consent were required prior to each interview. Only one youth per household was eligible to participate.

2.2. Study sample

Overall, 505 youth were invited to participate in the study. Of these, 85% (n = 428) agreed to participate and completed the Time 1 interview. Over all of the youth referred to the study, 4% were not appropriate for the study due to age or place of residence (n = 21), 11% passively or actively declined to participate (n = 54) and two were uncooperative during the interview and were dropped from the study. The youth were interviewed in English or Spanish at a convenient location in or near their home (e.g., in their house or yard, at a nearby park, or fast food restaurant) where no one else could overhear their answers. All were private face-to-face interviews with the respondent alone. Youth were given a set of showcards to use to help choose the answer that most closely represented how they felt or thought. Interviewers recorded these answers in the interview booklet.

Table 1
Age at each interview.

Age at First Interview		11	12	13	14	15	16	Total
Male	n	6	28	67	63	92	6	262
	%	2.3%	10.7%	25.6%	24.0%	35.1%	2.3%	100%
Female	n	7	16	31	36	37	2	129
	%	5.4%	12.4%	24.0%	27.9%	28.7%	1.6%	100%
Total	n	13	44	98	99	129	8	391
	%	3.3%	11.3%	25.1%	25.3%	33.0%	2.0%	100%

Age at Second Interview		12	13	14	15	16	17	Total
Male	n	5	16	54	71	68	48	262
	%	1.9%	6.1%	20.6%	27.1%	26.0%	18.3%	100%
Female	n	4	13	28	36	29	19	129
	%	3.1%	10.1%	21.7%	27.9%	22.5%	14.7%	100%
Total	n	9	29	82	107	97	67	391
	%	2.3%	7.4%	21.0%	27.4%	24.8%	17.1%	100%

A total of 391 follow-up interviews were completed at Time 2, a 91% retention rate. Youth were not re-interviewed for the following reasons: death (n = 2), lengthy period in custody and inability to get informed consent for the second interview (n = 4); family moved or could not be located (n = 27); and the youth or parent declined to consent to the follow-up interview (n = 4). At the second interview, the assessment (including questions designed to determine gang membership status) was again administered in a private context after obtaining active informed consent from a parent or guardian and from the youth. All youth interviewed were given a cash incentive for completing the interviews ($15 at Time 1 and $25 at Time 2). Nearly all (98%) of the Time 2 interviews took place between 12 to 18 months after the first interview as planned (nine youth were re-interviewed between 19 and 21 months later).

The vast majority of the youth in the longitudinal sample were Latino (81%) and 15% were Black. The remaining 4% identified themselves as White, Asian or Other. Most youth in the study sample were male (67%). The ages of those interviewed varied from 11 to 16 years at Time 1, and 12 to 17 years at Time 2 (see Table 1). The predominant ages for both the male and females recruited for this study were between 13 to 15 years old at the time of the first interview.

2.2.1. Measurement of risk factors and delinquency

The scales developed for the assessment were based on risk factors scales used in past research (see Appendix A). Due to the young age of many of the youth involved, we worked to produce an assessment that was as brief as possible without compromising the integrity of the scales. For this reason, we shortened each scale as much as possible while maintaining acceptable measurement properties. The scale length and internal validity (Cronbach's alpha) are given for each scale below.[3] The scales include: impulsive risk taking (4 items, alpha = .80); guilt neutralization (6 items, alpha = .81); antisocial tendencies (7 items, alpha = .70); negative peer influence (5 items, alpha = .78); friends' delinquency (8 items, alpha = .87); parental monitoring (3 items, alpha = .81); family gang influence[4] (2 items, alpha not applicable);

[2] The authors wish to thank Chief Jerry Powers and Deputy Chief Sharon Harada and the following dedicated Los Angeles County probation officers (team members): Joseph Ashe, Berry Bertelle, Meado Broddie, Joe Bush, Shauna Conner, Katherine Cooper, Diana Cunningham, Perry Danni, Ernie Echeverria, Esteban Endhir, Tara Fuller, Violet Hernandez, David Holmes, Earnest Johnson, Rosemary Kim, Sylvia Lewis, Dana Lewis-Rogers, Gil Macias, Debbie Nelson, John Parkin, Will Riley, Marina Rojas, Maryann Smiley, Leanne Steinhaus, Frank Trejo, Paul Vinetz, Marybeth Walker and Sandra Williams. We very much appreciate the time and effort from these probation officers. Neither the identity of the participating youth nor any information collected during the interview was shared with any probation employees or anyone else outside of the research team.

[3] Some scales that have been important in other settings were not related to gang joining in the Los Angeles context. For example, commitment to school and neighborhood characteristics are not included here. The school scale was not strong enough to be included based on our development work reported in Hennigan et al. (2014), and the neighborhood characteristics scale was likely neutralized by limiting the settings to neighborhoods where gangs were present.

[4] Family gang influence included having one or more family members in a gang and whether or not the youth believed that his or her family in general wanted him or her to join the gang.

count of critical life events (7 items); and a count of recent involvement in delinquency and substance use in the past year (17 questions).

2.3. Cut-points used to define high and low risk for each factor

The youth recruited for this study resided in areas where street gangs were present within the greater Los Angeles County area (but outside of the city limits). We assumed that the circumstances for gang joining among these youth would be similar to the youth referred to the secondary prevention programs within the Los Angeles city limits. Given this assumption, we applied the same risk factor cut-points that were calculated and used to select clients for the secondary prevention programs within the city of Los Angeles (see Hennigan et al., 2014).[5]

For the Los Angeles GRYD Program, we defined a cutpoint for each risk factor by examining the distributions of risk scores among the youth (of the same age within the selected high risk neighborhoods) who indicated that they were already gang-involved at the time of the first interview to provide some guidance on determining a reasonable cutpoint for each risk factor score. We found that the distribution on each risk factor scale among those already gang-involved was approximately 25% higher (riskier) than among the youth interviewed who had no serious indications of gang involvement. So the point on the distribution where 75% of the gang-involved youth were above the cutpoint was approximately equal to the point where 50% of the non-gang youth were above the cutpoint. Using this information, we defined a cutpoint for each scale close to the 50th percentile in the non-gang distribution, expecting that this would include most or all of the youth moving toward gang involvement as they progressed over time (Hennigan et al., 2014).

Each risk factor scale was dichotomized at the cutpoint: 0 equals low risk and 1 equals high risk. The accumulated number of high risks measured for each respondent then varied from zero to nine. Based on these calculations and the observation that gang joining is related to an accumulation of multiple risk factors across risk domains (Esbensen et al., 2009; Thornberry, Krohn, Lizotte, Smith, and Tobin, 2003), we classified each youth interviewed in this study as eligible for secondary prevention if he or she scored above the determined cut-point on four or more of the nine risk factors. We chose this level because these criteria included all of the gang-involved youth interviewed in the GRYD Program sample that we used to develop our program criteria. Interestingly, this also included all of the youth reporting gang membership in the current study. The decisions made for the GRYD Program were based on the desire to include all youth who may be at risk of gang joining, by prioritizing (not overlooking) youth who may join, knowing that some of the youth selected using this criteria will not have joined a gang even without the program's influence. The approach errs in the conservative direction, trying not to turn away any youth that might be on a path toward gang involvement.

In the context of this study, we applied these same cutpoints to the sample of youth recruited from probation referrals (i.e., behaviorally-based information) as were used for the GRYD Program neighborhoods in the City of Los Angeles. Other programs may choose to focus on other priorities. While one strategy is to capture all who might join a gang (as suggested above) another possible strategy is to focus also on minimizing the number of non-joiners brought into the program. In this case, setting eligibility to include those with 5 or more risk factors (vs. 4 or more factors as suggested above) could enrich the riskiness (percent who will join a gang) of the sample enrolled in a program. Including youth with five or more high risks (as opposed to four or more) would increase the number of gang-involved clients in the program – from 54% to 62% – and reduce the number of youth brought into the program who do not join a gang (at least over the year or so time frame used in the study) from 46% to 38%. The trade-off is that this approach would exclude five potential clients (one current, two former, and two youth with some gang involvement). These tradeoffs are options. Some may choose to be inclusive of all gang-involved youth and others may be willing to miss a few gang-joiners in favor of working intensively with fewer youth overall, i.e., with a higher percentage of probable gang joiners.[6]

2.4. Coding gang involvement and risk levels

After all of the interviews for this study were completed, two interviewers reviewed the interview responses to code four levels of gang involvement. The coders focused on the following interview questions: self-reported gang membership, a set of questions based on the Eurogang definition of gang membership that was developed to measure gang membership indirectly – without using the term gang (for more details of the Eurogang definition see Matsuda, Esbensen, and Carson, 2012; Weerman et al., 2009), and other contextual information including self-reported hanging out with gang members, participation in gang activities beyond just hanging out and an open-ended list of three things that the youth did with friends. The level of agreement between the coders was 77%. The differences were resolved through discussion.

Each respondent was classified into one of four levels of gang involvement based on his or her responses on the interview at Time 2. Respondents were coded as: a) no gang involvement (males: n = 174; females: n = 115); b) some gang involvement e.g., hanging out with friends in the gang, involved in some gang activities but not considered a member (boys: n = 43; females: n = 11), c) former gang member (males: n = 16; females: n = 2), and d) current gang member (males: n = 29; females: n = 1). Eight of the males indicated that they joined a gang and left during the 12 to 18 months between interviews, three were former gang members at Time 1 and at Time 2 and five others indicated gang membership at Time 1 but not at Time 2. Two females joined a gang and left in between the two interviews.

3. Results

Can the GREF assessment be used to screen those referred to a secondary gang prevention program in ways that both limit the number of youth brought into the program (to support more intensive interventions) and at the same time not exclude youth who in the absence of a program may otherwise choose to join a local street gang over the following months? The findings are reported separately for males and females.

3.1. Males: relationship between risk levels and gang involvement

Table 2 cross-tabulates the baseline GREF assessment score with the levels of gang involvement reported by males at Time 2. We observed that 100% of the males who were coded as gang members, 81% of males who were coded as former gang members, 74% of males who were coded as having some current involvement with a gang (e.g., just hanging out, short of gang membership) and 36% of males with no known gang involvement had been assessed as sufficiently high risk to be eligible for secondary prevention services at Time 1. All of the males assessed as eligible at baseline (i.e. with 4 or more high risks on the GREF assessment) would hypothetically have been enrolled in a secondary prevention program at Time 1.[7]

[5] This does not imply that only these risk factors will be optimal in all settings. Several other risk factors have been documented in various settings (see Esbensen et al., 2009; Thornberry et al., 2003).

[6] We appreciate feedback from one of the anonymous reviewers for bringing this option to our attention.

[7] From our point of view, there is no reason to explicitly deny assistance to youth who joined and left a gang at a young age, but are still scoring high on the risks assessed. Given that research suggests even short stints of gang involvement can have negative implications over the life course (Augustyn et al., 2014), even youth who have been involved in a gang a short time are likely to benefit from the program interventions that address the youth's behavior, and exposure to positive influences in the context of their family and social surroundings.

Table 2
Male gang involvement at Time 2 by eligibility measured at Time 1.

	Gang involvement									
	None		Some		Former		Member		Total	
	n = 174		n = 43		n = 16[a]		n = 29[b]		n = 262	
Eligibility status	n	%	n	%	n	%	n	%	n	%
Not eligible (0 to 3 risk factors)	112	64%	11	26%	3	19%	0	0%	126	48%
Eligible (4 or more risk factors)	62	36%	32	74%	13	81%	29	100%	136	52%
	$X^2 = 59.58$, df = 3, p = .000									

[a] Five indicated gang membership at T1 only, while 11 indicated that they joined and left a gang between T1 and T2.
[b] Eight of these males indicated gang membership at T1 and T2.

Table 2 shows that the assessment findings would not have excluded any males who joined a gang over the subsequent 12 to 18 months. Eleven males who reported some involvement well short of gang membership and three other males who indicated former gang membership, all had fewer than four high risks on the assessment and were not found eligible at Time 1. These youth would not have been included in a secondary prevention program.

Of the 136 males who were found eligible for a program at Time 1 (with 4 or more high risk factors), slightly more than half (n = 74) reported some participation in gang activities over the subsequent 12 to 18 months — with about 30% classified as current or former gang members (n = 42). Eligibility was strongly related to levels of gang-involvement ($X^2 = 59.58$; df = 3, p = .000). Without the use of the assessment, if all 262 of the males had been enrolled in prevention, the program had the potential to prevent 11% (29 out of a total of 262) of the participants from joining a gang. Using the assessment however, the program would have enrolled only 136 males and worked with twice as many potential gang members (21% including 29 out of a total of 136 eligible males). Overall the program would have the potential to influence 54% (74 out of 136) of the eligible clients who were destined to have some gang involvement (in the absence of program services).

Next we examined the association between each risk factor measured at Time 1 and levels of gang involvement at Time 2. For the males in the study (see Table 3), each of the three personal risk factors measured on the assessment (including impulsive risk taking, guilt neutralization and antisocial tendencies) was significantly related to gang involvement (X^2 values range from 19.09 to 39.79, df = 3, p < .000). Each family factor (parental monitoring and family gang influence) was significantly related ($X^2 = 30.70$ to 52.46, p < .000) and both peer factors (friends negative influence and friends' involvement in delinquency) were strongly related to gang involvement ($X^2 = 27.27$ to 53.67, p < .000). We were surprised to find that the relationship with accumulated critical life events was weak ($X^2 = 7.60$, df = 3, p < .055), given a very strong relationship found between this factor and gang involvement among clients in other contexts (see Hennigan et al., 2014). Perhaps this weaker finding is related to the origin of the sample used here (derived primarily from referrals received from probation contacts rather than more heterogeneous community-wide referrals). Nearly all of the participants in this study had recent interactions with probation and/or law enforcement. These recent interactions may have generally increased the number of critical life events for all youth in this sample. Perhaps for the same reason, self-reported delinquency was very strongly correlated with levels of gang involvement ($X^2 = 58.17$, df = 3, p < .000). These results, summarized in Table 3, confirm that each risk factor measured at Time 1 was significantly related to gang involvement at Time 2 for the males in the sample.

3.2. Females: relationship between risk levels and gang involvement

Table 4 cross tabulates the scores on the baseline assessment at Time 1 with the levels of gang involvement found at Time 2 for the 129 females in the longitudinal sample. Only 3 females indicated ever having been a gang member, and 11 others indicated having some gang involvement. Given the relatively small number of gang-involved females in the study, we collapsed the table to include two levels of gang involvement for the females: no involvement vs. any involvement. There is a significant difference in level of gang involvement at Time 2 among the females who were or were not found eligible for secondary prevention based on the assessment at Time 1 ($X^2 = 15.63$, df = 1, p = .000). Only one female who had some involvement with gang members (but was not a member) scored as ineligible for secondary prevention based on her risk factors. Overall, 43% of the females in the study were found to be eligible for secondary prevention. Forty-three of the girls reported no gang involvement at all and 13 reported some gang involvement at Time 2. Of those who scored eligible for secondary prevention on the baseline assessment (n = 56) at Time 1, 13 (23%) subsequently reported some gang involvement over 12 to 18 months.

The association between each risk factor included on the assessment at Time 1 with gang involvement for the females in the study at Time 2 is shown in Table 5. Two of the personal factors, antisocial tendencies and impulsive risk-taking, were not significantly related to gang involvement in the sample. Further, the critical life events measure was not related to gang involvement among the girls in this sample. Part of the issue here may be related to the riskiness of the female sample (based on recent involvement with county probation), or may be due to different dynamics among females with regard to gang membership. Each of the other risk factors varied significantly between the females with no gang involvement and the females with any level of gang

Table 3
Male gang involvement by risk factors at Time 1: number (%) above the high risk cutpoint.

Gang involvement	n = 174 None		n = 43 Some		n = 16 Former		n = 29 Member		
	n	% above	n	% above	n	% above	n	% above	
Personal factors									
Antisocial tendencies	42	24%	23	54%	5	31%	15	52%	$X^2 = 19.09$, df = 3, p < .000
Impulsive risk taking	59	34%	23	54%	10	63%	21	72%	$X^2 = 20.50$, df = 3, p < .000
Guilt neutralization	50	29%	25	58%	10	63%	2	83%	$X^2 = 39.79$, df = 3, p < .000
Family factors									
Parental monitoring	44	25%	22	51%	2	13%	20	69%	$X^2 = 30.70$, df = 3, p < .000
Family gang influence	68	39%	34	79%	13	81%	28	97%	$X^2 = 52.46$, df = 3, p < .000
Peer factors									
Friends negative influence	40	23%	18	42%	9	56%	19	66%	$X^2 = 27.27$, df = 3,p < .000
Friends delinquency	67	39%	31	72%	15	94%	28	97%	$X^2 = 53.67$, df = 3, p < .000
Accumulated critical life events									
Critical life events (last 6 months)	70	40%	24	56%	10	63%	17	59%	$X^2 = 7.60$, df = 3, p < .055
Crime involvement									
Self-report delinquency	68	39%	35	81%	16	100%	29	100%	$X^2 = 58.17$, df = 3, p < .000

Table 4
Female gang involvement at Time 2 by eligibility measured at Time 1.

	Gang involvement					
	None		Any involvement		Total	
	n = 115		n = 14[a]		n = 129	
Eligibility status	n	%	n	%	n	%
Not eligible (0 to 3 risk factors)	72	63%	1	7%	73	57%
Eligible (4 or more risk factors)	43	38%	13	93%	56	43%
	$X^2 = 15.630$, df = 1, p = .000					

[a] All females with any gang involvement are included here (only 3 were current or former gang members). The one female in this group was found not eligible; she had some gang involvement but was not a member.

involvement (with X^2 ranging from 6.49 to 17.15, $p < .011$), suggesting that the assessment is useful for females. However, further research is needed, with a larger sample of gang-involved females, to more broadly test the usefulness of the GREF assessment for females.

4. Discussion

4.1. Concerns about deviancy training

Looking back, we found that eight of the boys in this study had already indicated substantial gang involvement at Time 1. If these young boys were brought into a secondary prevention program, the providers would need to be aware of the challenges of including young clients who may already be gang-involved and appear to be active in this regard. The probability of negative influence on others is heightened if the program clients are gathered in group settings and engage in group activities. A continuing challenge facing secondary prevention programs is how to engage high-risk youth who may already be orienting toward a neighborhood street gang, but are detected early and at a young age, without influencing other at risk but more naïve clients? Here we suggest that programs may purposefully engage these very high risk youth, including those with one foot already in the gang, so long as the program embraces approaches that work with the youth individually in the context of his or her family. This concern underscores the importance of program structure, avoidance of unsupervised opportunities for risky youth to congregate as part of the program (Boxer, Kubik, Ostermann, and Veysey, 2015; Dishion and Dodge, 2005; Dishion et al., 1999; Dodge et al., 2006; Hennigan et al., 2010; Piehler and Dishion, 2007), and underscores the importance of the program's focus on individual clients in the context of his or her family.

4.2. Prospective validity of client selection

This study confirms the prospective validity of the GREF assessment as a tool that can be used to predict gang involvement and strengthen secondary prevention programs by increasing the focus on high-risk youth. In this study sample, the assessment was successful in prospectively identifying all of the respondents who later reported gang membership and most of the males that reported former or current gang involvement short of membership.

4.2.1. Findings for the males

The study findings strongly support the usefulness of applying the GREF assessment to increase the potential reach and impact of secondary gang prevention programs for males. Overall, use of the assessment cuts in half the number of males that could be enrolled in secondary gang prevention, without concern for missing males who would otherwise join a gang over the subsequent 12 to 18 months. The chart below (Fig. 1) shows the distribution of gang involvement across the number of elevated risk factors assessed — from zero to nine. An inclusive program would set the eligibility requirement at 4 or more risk factors. The results here suggest that using this strategy would include all of the males who later joined a gang (100%), most of the males who identified themselves as former gang members (81%), and most of the males who reported casual participation with the local gang (74%).

4.2.2. Findings for females

The findings were similar but not as strong for the females in the study, due in part to relatively little gang involvement among females in the sample interviewed. At the initial assessment, 43% of the girls in the sample were found eligible for secondary prevention. Of these, 23% reported some gang involvement over the subsequent 12 to 18 months. The study findings support the importance of including females, even though we may not fully understand the differential dynamics of female involvement in gangs at this time (Miller, 2001; Peterson, 2012). A relatively small number of females recruited for this study were current or former gang members (n = 3) and 11 others had some gang involvement. Of these, only one female (who reported some gang involvement but was not a member) was assessed as low risk at Time 1. All of the other girls who reported some level of gang involvement at Time 2 had four or more high risk factors at Time 1 (Fig. 2). However, three of the nine risk factors (critical life events, antisocial tendencies and impulsive risk taking) were not significantly related to gang involvement among the high-risk girls in the sample. Given the small sample of gang-involved girls, statistical power may be an issue.

Overall, the study results suggest that this assessment may be more efficient for identifying the boys in need of assistance than for the girls.

Table 5
Female gang involvement by risk factors at Time 1: number (%) above the high risk cutpoint.

Gang involvement	n = 115 noNe		n = 13 Any		
	n	% above	n	% above	
Personal factors					
Antisocial tendencies	28	24%	5	36%	$X^2 = 0.35$, df = 1, p = .357
Impulsive risk taking	48	42%	8	57%	$X^2 = 1.21$, df = 1, p = .272
Guilt neutralization	32	28%	10	71%	$X^2 = 10.81$, df = 1, p = .001
Family factors					
Parental monitoring	29	25%	9	64%	$X^2 = 9.17$, df = 1, p = .005
Family gang influence	55	48%	12	86%	$X^2 = 7.18$, df = 1, p < .007
Peer factors					
Friends negative influence	25	22%	10	71%	$X^2 = 15.59$, df = 1, p < .000
Friends delinquency	49	43%	11	79%	$X^2 = 6.49$, df = 1, p = .011
Accumulated critical life events					
Critical life events (last 6 months)	56	49%	8	57%	$X^2 = 0.36$, df = 1, p = .551
Crime involvement					
Self-report delinquency	34	30%	12	86%	$X^2 = 17.15$, df = 1, p = .000

However, it is difficult to know whether these findings on girls would hold for a larger and more risky sample. While the girls in this sample were lower risk than the boys (based on the criteria used here), in the GRYD Program context we found that girls referred to secondary gang prevention were at similar (or even higher) risk levels as the referred boys (e.g., Hennigan et al., 2014). More research is needed on the dynamics of gang-joining including research that examines influential risk factors or circumstances that are most closely associated with gang joining among the girls in at-risk neighborhoods

4.3. Program efficiency

A key goal to prevent gang joining is to identify which youth appear to be most vulnerable to gang influence at a young age and to identify them before they join. But how efficiently is this accomplished? In the absence of any programmed intercession to change trajectories, the ultimate outcome – to join a gang or other violent group or not – is left to the vagaries of the youth's neighborhood, and personal, social and family environment. For example, does the youth become alienated by exposure to a dysfunctional neighborhood environment? Is he running away from hurtful, untenable, resented or neglectful circumstances in a dysfunctional family (push)? Does he bond with other youth or even other family members who are moving toward gang involvement? Is he attracted to the excitement and power and comradery he finds in risky circumstances without much concern or awareness of consequences (pull)? A host of issues have been associated with gang joining, including blocked opportunities, multiple marginalization, family dynamics and more. Researchers have identified a myriad of influences and contexts that underlie the phenomenon of gang affiliation (see Decker, Melde, and Pyrooz, 2013 for a comprehensive review), yet there is no flawless way of predicting who will and who will not join a gang in the impacted neighborhoods. Our goal here is to test an approach to identify youth *likely to be at high risk for gang joining*, based on the empirical data accumulated from multiple longitudinal studies. While complex dynamics within individual, family, peer and neighborhood contexts are all involved in the processes of joining a street gang, empirical research suggests that those most likely to join can be identified by an accumulation of risks commonly shared by the youth between the of ages 10 to 16 who join a gang. This is not to say that the risk factors are causal or that the identification is flawless. While we were able to observe that all who joined a gang over the 12 to 18 months after the baseline assessment were identified, only about half of those identified actually became involved with a local gang over this timeframe and about half did not. We cannot know how many others may join in the future or for how many others circumstances may change.

Clearly the dynamics associated with joining are more complicated than a set of risk factors. While complex social and behavioral dynamics remain the cause, this study suggests that we can use empirical data to identify a subset of youth at elevated risk for joining a street gang, and this provides an opportunity to intervene prior to gang joining via an intensive secondary prevention program that works with each youth individually in the context of his or her family and environment (i.e., not in a group program). Strengthening protective pathways at a young age requires a focus on many of the same circumstances and social processes in the youth environment that entice and encourage gang joining (not necessarily the risk factors per se). The goal is to use the influence of an intensive secondary prevention program to promote prosocial development by working on an array of circumstances (unique to each individual) and by intervening with each client in the context of the family, friends and mentors who support prosocial views and activities. The risk assessment can be used to identify youth with a range of needs for positive support and provide a means of reaching those with highest needs. Not all of the youth identified by the assessment would otherwise join a gang. However, community programs might be more concerned about not missing youth that may otherwise engage with the local gang than with the inclusion of high risk youth who may not have joined a gang even in the absence of the program. The data here suggest that using the GREF assessment to identify youth for intensive secondary prevention can cut in half the number of youth (even in a population of youth recruited from local probation programs) who might otherwise have been engaged in a prevention program.

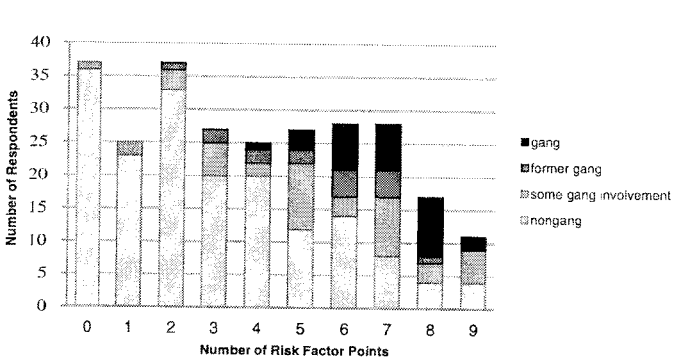

Fig. 1. Males: Time 1 risk factors predicting gang involvement at time 2.

4.4. Common challenges for secondary prevention programs

The idea of using an assessment to select youth for secondary gang prevention is often met with high levels of skepticism from program partners.[8] This skepticism echoes the experiences chronicled by Melde et al. (2011), who found that youth referred to gang prevention programs in high-risk areas such as the one in Cuyahoga County, Ohio were actually not higher risk that the nearby general school population. This study provides empirical support for the utility of an assessment to focus enrollment in secondary prevention programs on high-risk clients to support intensive intervention. In addition, the assessment helps guide these interventions by providing immediate feedback to the program counselors on which specific risks (attitudes, behaviors and circumstances) are influencing each client. Feedback to the counselors on the risks flagged by the GREF assessment provides a starting point to intervene in ways that can support changes in personal development in the context of family and peer relations and to encourage the development of a prosocial or conventional social identity (i.e., a counterpoint to a gang identity).

A focus on family is consistent with recent findings that former gang members indicate that *support from family* was their strongest influence on desistance — nearly double the influence of any other source (Decker, Pyrooz, and Moule, 2014). It appears that family is also likely to be a strong resource in the context of secondary gang prevention. Promising family-based secondary prevention program approaches have been identified and are being tested by Guillermo Cespedes[9] (Family Systems) and by Terence Thornberry and Denise Gottfredson[10]

[8] For example, most of the agencies involved in the secondary prevention program in the City of Los Angeles initially resisted the requirement that the assessment be used to screen for youth as a condition of program enrollment. The director of one program who had expressed very strong doubts about the need for the screening process to reach the at-risk youth later expressed her realization that screening with the assessment was bringing in youth who were at much higher risk than she had previously encountered in her work within the community. She became an advocate for the assessment.

[9] The program model developed by Guillermo Cespedes was originally developed in the context of the Los Angeles GRYD Program and is now being tested in Honduras and Mexico through USAID/CARSI efforts. This model uses the GREF Assessment (called the H-YSET and M-YSET in these contexts) to support diagnostic processes that guide specific Family Systems-centered interventions.

[10] The Blueprints for Gang Prevention Project, led by Thornberry and Gottfredson (2013), is conducting a randomized controlled trial of Functional Family Therapy to ascertain its effectiveness in reducing gang membership and delinquency among youth at high risk of joining gangs and current gang members. See http://www.ccjs.umd.edu/projectprofile/823.

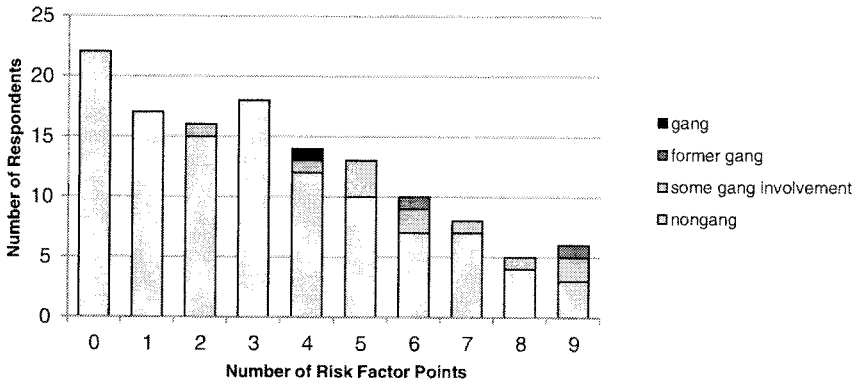

Fig. 2. Females: Time 1 risk factors predicting gang involvement at time 2.

(Functional Family Therapy), however to date there has been no empirical validation of these approaches in this context. Further, a recent report of the efficacy of the use of Multi-Systemic Therapy (MST: Henggeler, Schoenwald, Borduin, Rowland, and Cunningham, 2009) with gang-involved youth demonstrates the challenges of implementing interventions focused on reducing involvement in gang activities. Boxer et al. (2015) compared outcomes for youth referred to the juvenile justice system, who received Multi-Systemic Therapy, and were or were not gang-involved. They reported much higher rates (double the rate or more) of successful case closure using MST among non-gang youth than among gang-involved youth (with and without propensity matching). Given this knowledge, addressing potential gang involvement at the secondary prevention program level may be especially important because the effectiveness of these therapies may become less so once youth have become full-fledged gang members (see Decker et al., 2013).

Controlled empirical tests of the outcomes of these therapeutic approaches in the context of secondary prevention programs are unknown at this time. Nor are we aware of any strong evaluations of the impact of the secondary prevention programs using the GREF assessment. Changes in risks and behaviors *within the cohort included in the programs* have been tracked (at intake and every six months) but this approach alone is likely to produce unreliable results due to regression to the mean (see Cook and Campbell, 1976; Trochim, 2006) because only youth with high risk scores are enrolled (i.e., those with high scores are more likely to err in the high direction than low direction). A simple measure of change calculated by re-interviewing the original sample *in its entirety* (comparing net decrease among both the ineligible and eligible youth combined) to track overall change in clients over time may be subject to less bias. The inclusion of a no treatment or alternative treatment comparison (ideally randomly assigned) is ultimately needed to document program success.

A continuing challenge facing secondary prevention programs is how to engage high-risk youth who may already be moving toward joining a neighborhood street gang, but who are detected early and at a young age. Here we are advocating that programs purposefully engage these high-risk youth, possibly including some with one foot already in the gang and some with strong family gang contexts. Program providers need to bear in mind, however, that a youth who already has strong gang ties can influence others in the program to move toward the gang rather than away from it if this potential influence is not carefully managed. This concern underscores the importance of family-centered programs that avoid unsupervised opportunities for risky youth to congregate as part of the program (Boxer et al., 2005; Dishion and Dodge, 2005; Dishion et al., 1997, 1999; Dodge et al., 2006; Hennigan et al., 2010; Piehler and Dishion, 2007) and emphasizes the importance of a program's focus on each individual client in the context of his or her family.

In closing, we want to emphasize that using the empirically identified risk factors to predict gang affiliation does *not* imply that these factors are the proximal cause of gang joining. The study confirms that an accumulation of risk factors can be used to flag potential for gang involvement, especially among males. However, a focus on an accumulation of certain risks to select youth for secondary prevention does not imply that the program should be singularly focused on risk reduction. Quite the contrary, successful programs are likely focused more on developing strengths which may neutralize the risks.

Not all youth in challenging neighborhood contexts gravitate toward street gangs, but approximately 10 to 19% may do so. Longitudinal studies found that approximately half of the youth who join a gang sever ties within the first year or so (Klein and Maxson, 2006) while the rest continue and become invested in the lifestyle. It is apparent that those growing up in marginalized areas where violence and bravado are common, where parents are themselves sometimes struggling and are unable (or unwilling) to provide needed guidance, and where gang members in the community can and do serve as role models, that gang membership can provide a much needed social identity for vulnerable youth. Regardless of other shortcomings, gang identity commands respect on the street. The challenge of secondary gang prevention programs is to focus on high-risk adolescent youth and their families in ways that encourage and support alternative identities (Hennigan and Spanovic, 2012) that also command respect to break the pattern of adolescent gang involvement that sustains cycles of dysfunction and maltreatment over generations (Augustyn et al., 2014; Thornberry and Henry, 2013). A secondary prevention approach focuses the limited resources available on intensive efforts to increase commitment to positive attitudes and behaviors and strengthen resistance to gang joining among the youth who are most vulnerable to the appeal of a gang identity.

Appendix A

A.1. Individual risk factors

The first three risk factors selected for the assessment focus on a variety of personal attitudes and behaviors that contribute to or are associated with a gang-related self-image (Decker, 1996; Decker and van Winkle, 1996; Klein, 1995; Vigil, 1988). These include impulsive risk taking, guilt neutralization, and antisocial tendencies.

1) *Impulsive Risk Taking.* This risk factor evolved from research focused on the broad concept of self-control that originally encompassed six correlated concepts strongly related to criminal activity (Gottfredson and Hirschi, 1990; Grasmick, Tittle, Bursik, and Arneklev, 1993). Two of these concepts, impulsivity and risk-taking, were included in the beta version of the GREF assessment

because their relationship with gang joining has been tested and consistently confirmed in cross sectional and longitudinal studies in several locations (Craig, Vitaro, Gagnon, and Tremblay, 2002; Esbensen, Huizinga, and Weiher, 1993; Esbensen and Weerman, 2005; Gatti, Tremblay, Vitaro, and McDuff, 2005; Hill, Howell, Hawkins, and Battin-Pearson, 1999; Huizinga, Weiher, Menard, Espiritu, and Esbensen, 1998; Lahey, Gordon, Loeber, Stouthamer-Loeber, and Farrington, 1999; Maxson, Whitlock, and Klein, 1997; Pederson and Lindstad, 2012; Thornberry et al., 2003). Burt, Sweeten, and Simons (2014) provide recent confirmation that from early to middle adolescence, these two concepts are associated with crime, and that individuals do experience changes in the level of these constructs over the life course (suggesting that these factors are malleable and can be altered over time). Since impulsivity and risk-taking were highly correlated in our data (Hennigan et al., 2014), the scale used in the GREF was shortened and combined into a single scale for the assessment.

2) *Guilt Neutralization.* Moral justifications for crime (Agnew, 1994) have been consistently linked to involvement in criminal activities, and have been found to predict or correlate with gang involvement in most of the studies that have tested it. This factor was significantly related to gang membership in studies reported by Alleyne and Wood (2013), Esbensen and Weerman (2005), Esbensen, Winfree, He, and Taylor (2001), Hill et al. (1999), Huizinga et al. (1998) and Thornberry et al. (2003). We adopted the version of the scale used by Esbensen and Osgood (1999) in their work with the G.R.E.A.T. program.
3) *Antisocial Tendencies.* The relationship between gang joining and broadly defined conduct disorder or externalizing behavior (e.g., lying, stealing, getting angry) was tested prospectively in several longitudinal studies across the United States. A significant relationship with gang joining has been consistently confirmed by researchers (Craig et al., 2002; Dishion, Nelson, and Yasui, 2005; Gatti et al., 2005; Hill et al., 1999; and Thornberry et al., 2003) using either the Achenbach Child Behavior Checklist (Achenbach, 2009) or the Social Behavior Questionnaire (Tremblay et al., 1991). Given our goal to create an assessment readily available to a myriad of prevention providers, we chose to work with a scale that is in the public domain, the Goodman Strengths and Difficulties Questionnaire (Goodman and Goodman, 2009; Goodman and Scott, 1999). This scale is appropriate for 11 to 16-year-olds and correlates well with the Child Behavior Checklist used in most past studies (Achenbach et al., 2008; Bourdon, Goodman, Rae, Simpson, and Koretz, 2005). We adapted this scale for use on the GREF assessment.

A.2. Peer related risk factors

The next two risk factors selected for the assessment are focused on the influence that peers have on the respondents' behaviors. Respondents are asked a series of questions to gauge the strength of negative peer influence and the extent to which their friends are involved in delinquent activities.

4) *Negative Peer Influence.* Friends can be very influential in the lives of adolescents. Youth who are susceptible to negative peer influence are more likely to go along with trouble. Joining a gang is a social act that is very much tied to peers. Longitudinal and cross sectional studies found that youth who are committed to peers, despite their negative influence, are more likely to join a gang. This risk factor is linked to gang joining in each of the major longitudinal and cross sectional studies that have tested it, including Esbensen et al. (2001); Hill et al. (1999) and Maxson and Whitlock (2002). The questions used to measure this construct in the G.R.E.A.T. evaluation (Esbensen and Osgood, 1999) were adopted for this assessment.
5) *Peer Delinquency.* The hypothesis that associating with delinquent peers causes delinquent behavior is based on social learning theory based on the work of Akers, Krohn, Lanza-Kaduce, and Radosevich (1979). This risk factor is strongly associated with gang joining in each of the major longitudinal and cross sectional studies that have tested it, including Craig et al. (2002), Eitle, Gunkel, and Van Gundy (2004), Esbensen et al. (1993), Esbensen and Weerman (2005), Esbensen et al. (2001), Hill et al. (1999), Huizinga et al. (1998), Lahey et al. (1999), Maxson and Whitlock (2002) and Maxson et al. (1997). The scale used to measure this construct for the G.R.E.A.T. program evaluation (see Esbensen and Osgood, 1999) was adopted for this assessment.

A.3. Family risk factors

The next two risk factors selected for the assessment are focused on the influence of family, especially on the actions of the respondents' parents (or guardians) as well as other family members. These include the level of parental monitoring and the extent to which members of their family are themselves involved in gang activities and convey to the youth an expectation that the youth is likely to be involved as well. Recent findings from a ten year longitudinal study in Mobile, Alabama suggest that parental warmth may also contribute to the prediction of gang joining (Church et al., 2012; Jaggers et al., 2013), but this factor has not yet been empirically tested in the context of the GREF assessment.

6) *Parental Monitoring.* Many aspects of parenting might contribute to youth becoming involved in a gang; however, parental monitoring has emerged as the one aspect with consistent evidence. Parental monitoring has been defined in various ways. Lac and Crano (2009) reviewed the role of parental monitoring and its relationship to risky adolescent behaviors. Their conceptual analysis emphasizes that parental monitoring is related to positive parent–child relations including family warmth, cohesion, involvement and communication. The measure used here is focused on parental knowledge of the child's activities, whereabouts and relationships that stem from a child's willing disclosure (Kerr and Stattin, 2000). The strength of this factor derives from its implicit incorporation of both the youth's honesty (and dishonesty) with the parent as well as the parents' own interest and skills (or disinterest / lack of skills) monitoring and communicating some boundaries for their youth (Kiesner, Dishion, Poulin, and Pastore, 2009; Lac and Crano, 2009). This factor has been significantly related to gang joining in studies reported by Esbensen et al. (1993), Esbensen and Weerman (2005), Gatti et al. (2005), Hill et al. (1999), Huizinga et al. (1998), Maxson and Whitlock (2002), McDaniel (2012), Pederson and Lindstad (2012) and Thornberry et al. (2003). For the beta version of the assessment, we adopted questions used in the G.R.E.A.T. evaluation (Esbensen and Osgood, 1999) to measure monitoring.
7) *Family Gang Influence.* Family gang influence was defined as having two or more family members who either were themselves currently involved in a gang or that family members had communicated that they expected the youth to join the gang. These questions were developed based on a set of family gang influence questions pilot tested in the context of the Los Angeles GRYD Program (see Hennigan et al., 2014). This context-specific factor may or may not be relevant in other community contexts, especially if gangs are relatively new to the community.

The next risk factor included is the accumulation of serious life events that are negative or stressful from the young respondent's point of view. This factor includes events related to multiple contexts including relationship issues, negative events at school or in the neighborhood, as well as negative events affecting close family members or friends.

A.4. Accumulation of critical life events

8) *Critical Life Events.* This factor evolved from research focused on Agnew and Raskin White's (1992) and Eitle et al. (2004) general strain theory that documents a strong relationship between an array of chronic stressors or accumulated negative life events and delinquency. Recent research has focused on the relationship between accumulated stressful life-events (such as school failure, school disciplinary sanctions, difficulties or changes in relationships with friends, and illness or death of loved ones) with gang joining. A checklist method is used to measure an accumulation of powerful life events over a relatively short period of time that contributes to an adolescent's stress or strain. This factor was significantly related to gang membership in studies reported by Maxson and Whitlock (2002), Maxson et al. (1997) and Thornberry et al. (2003). The scale used in the Rochester study (Thornberry et al., 2003) was adopted for the GREF assessment.

A.5. Participation in delinquent activities

Finally, personal participation in delinquent activities is of course strongly associated with gang involvement. We include this factor on the assessment to both contribute to the prediction of gang joining as well as to provide important outcome information, providing the opportunity to monitor desistance from criminal activities over time.

9) *Early Delinquent Activities and Substance Use.* A youth's own involvement in delinquent activities including substance use often precedes or coincides with joining a street gang (Esbensen et al., 1993; Huizinga et al., 1998; Krohn and Thornberry, 2008; Thornberry et al., 2003). Several major longitudinal studies confirm the observation that delinquent behavior increases with gang joining and decreases upon leaving the gang. The scale used in the beta version of the assessment was derived from the G.R.E.A.T. evaluation (Esbensen and Osgood, 1999). The measure adopted for the assessment combines delinquent activities and substance use into a single indicator by counting the number of types of delinquent activities, including substance use, that the youth reported to create a variety score (see Thornberry and Krohn (2000) for a discussion of the validity of this approach).

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