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Carlotta Raby B.A., P.G. Cert., P.G. Dip., M.A., M.Ed.

**IDENTIFYING RISKS FOR MALE STREET GANG AFFILIATION: A SYSTEMATIC
REVIEW AND DESIGN AND VALIDATION OF THE GANG AFFILIATION RISK
MEASURE (GARM)**

Section A: Identifying Risks for Male Street Gang Affiliation: A systematic review and narrative
synthesis

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Section B: Design, Development and Validity Testing of the Gang Affiliation Risk Measure
(GARM)

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Content Summary

Section A is a systematic review, which aimed to identify risks for male street gang-affiliation. Initial literature searches identified in n = 244 peer-reviewed papers and n = 16 service reports, n = 102 of which met the inclusion criteria; a narrative synthesis follows. Subsequent clinical and research recommendations were made to inform early intervention policy and practice.

Section B is the creation and validation of the first UK gang affiliation risk measure. Male gang-affiliated and non-gang affiliated participants between the ages of 16-25 (n = 185) participated in the study, resulting in a 15-item gang affiliation risk measure (GARM). The GARM was then tested for internal consistency, construct validity and discriminative ability. GARM is the first measure of gang-affiliation, offering an effective tool for the identification of vulnerable individuals, and targeted early intervention. A predictive version has also been created, but requires further validation.

Section C provides appendices for both sections.

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Section A:

Identifying Risks for Male Street Gang Affiliation:
A systematic review and narrative synthesis

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Abstract

Gang violence has increased in recent years. Individuals are becoming gang-affiliated younger, and many have suffered historic maltreatment. Subsequent exposure to violence can result in profound consequences, including acute psychological harm. This review aims to identify predictive risk factors for male street gang-affiliation. A systematic literature search was conducted utilising PsycINFO, PsycARTICLES, Medline, the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews and the Social Policy and Practice databases (from the databases' inception to 03/04/15). From this search, n = 244 peer-reviewed papers were included in an initial scoping review, and n = 102 thereafter met criteria for a systematic review; a narrative synthesis follows. Gang members have typically faced numerous historic adversities across multiple domains; individual, family, peers, school and community. Cumulative factors generated an independent risk. The meta-narrative described an overarching failure to safeguard vulnerable individuals, with the motivation for gang affiliation hypothetically arising from an attempt to have their basic needs met. Clinical and research recommendations were made to inform early intervention policy and practice.

Keywords: gangs, risks, community, violence, safeguarding, mental health

Introduction

Definition of ‘Gang’

The classification of ‘gang’ is widely debated within the literature (Esbensen, Winfree, He & Taylor, 2001). This study uses the Eurogang definition (Weerman, Maxson, Esbensen, Aldridge, Medina, & Van Gemert, 2009, p. 20):

‘(A gang is) any durable, street-oriented youth group whose involvement in illegal activity is part of its group identity.’

Literature

Esbensen and Huzinga (1993), Thornberry, Hawkins and Krohn (1998), and Hill, Howell, Hawkins and Battin-Pearson (1999) suggested that gang-affiliated individuals are a particularly vulnerable group, affected by compound risk factors in their early years. A hypothetical developmental model for gang-affiliation was proposed by Howell and Egley (2005), suggesting that risks were present across five domains, namely at an individual level, within the family, from peer friendships, at school and within the community. This research highlighted that the cumulative nature of these risks presented a sixth independent risk. Furthermore, risks were seen to begin at the preschool age and to increase throughout childhood (to a point of gang-affiliation in mid-adolescence).

Barnes, Boutwell and Fox (2012) and DeLisi, Barnes, Beaver & Gibson (2009) suggested that once gang-affiliated, individuals are further violently victimised, with gangs facilitating increased aggression and criminal activity (Curry & Spergal, 1992). Coid, Ullrich, Keers, Bebbington, DeStavola, Kallis, Yang, Reiss, Jenkins & Donnelly (2013) highlighted the high

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level of traumatic exposure experienced by gang members in the United Kingdom (U.K.), resulting in acute

psychiatric need, and creating a heavy burden on the National Health Service (NHS). In recent years, public safety in the U.K. has increasingly been threatened by gang violence (U.K. Centre for Social Justice, 2012; U.K. Mayor's Office for Policing and Crime, 2015), and reports from young offenders' institutions suggest little opportunity for psychological intervention once perpetrators of violence have received custodial sentences, due to chronically low staffing levels (Harris, 2015).

Rationale for the Review

Gang-affiliated individuals are considered to be affected by multiple stress exposure throughout their early developmental stages and, as adults, appear to have significant mental health difficulties. This would suggest a unique role for mental health professionals to assist multi-disciplinary preventative teams to better understand early risk pathways, the impact of risk exposure, and to recommend effective psychological support in an effort to prevent further harm to themselves and others.

Although attempts have been made (Fisher, Gardner & Montgomery, 2008a, 2008b; Hodgkinson, Marshall, Berry, Newman, Reynolds, Burton, . . . Anderson, 2009) to undertake systematic reviews of predictive risks for gang-affiliation, Fisher et al. (2008a, 2008b) found that no studies met their specific inclusion criteria, and Hodgkinson et al. (2009) focussed purely on interventions. The current lack of systematic reviews in this area creates an obstacle for already overstretched services to design targeted, evidence-based interventions; an issue that this review attempts to redress.

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Research Aim

This systematic review initially aimed to identify predictive risk factors for male street gang-affiliation in the U.K. However, there was a dearth of U.K. centred peer-reviewed research on male street gang affiliation (Marshall, Webb, Tilley & Dando, 2005). Therefore, the search was widened to include international sources.

As males were significantly over-represented in the gang-affiliated population (Pyrooz, 2014; Pyrooz & Sweeten, 2015; Farmer & Hairston, 2013), and given that the Office of the Children's Commissioner (2015) had undertaken extensive research on female gang-affiliation, this review focussed on a male population.

There were no age-specific inclusion criteria for this study. However, predictive risks were the main focus. In general, these featured in childhood and early adulthood. Developmental processes were considered in the analysis of the findings.

The overarching question this study set out to answer was whether predictive risks for male street gang-affiliation could be identified and summarised from a systematic review of the wider literature.

Methodology

Design Type

This research utilised a systematic review process, and findings were then narratively synthesised (Le Bouillier et al., 2015; Moher, Shamseer, Clarke, Ghera, Liberati, Petticrew & Stewart, 2015).

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Search Process

An expert group was set up by the 'Ending Serious Group Violence Team' at the Home Office in the U.K. to assist with the identification of appropriate search terms. The group offered suggestions regarding risk factors they considered to be related to gang-affiliation, in addition to sending internally published service reports (n = 16). Along with reviewing gang literature, this informed the search terms. See Figure 1 for the overall methodological process.

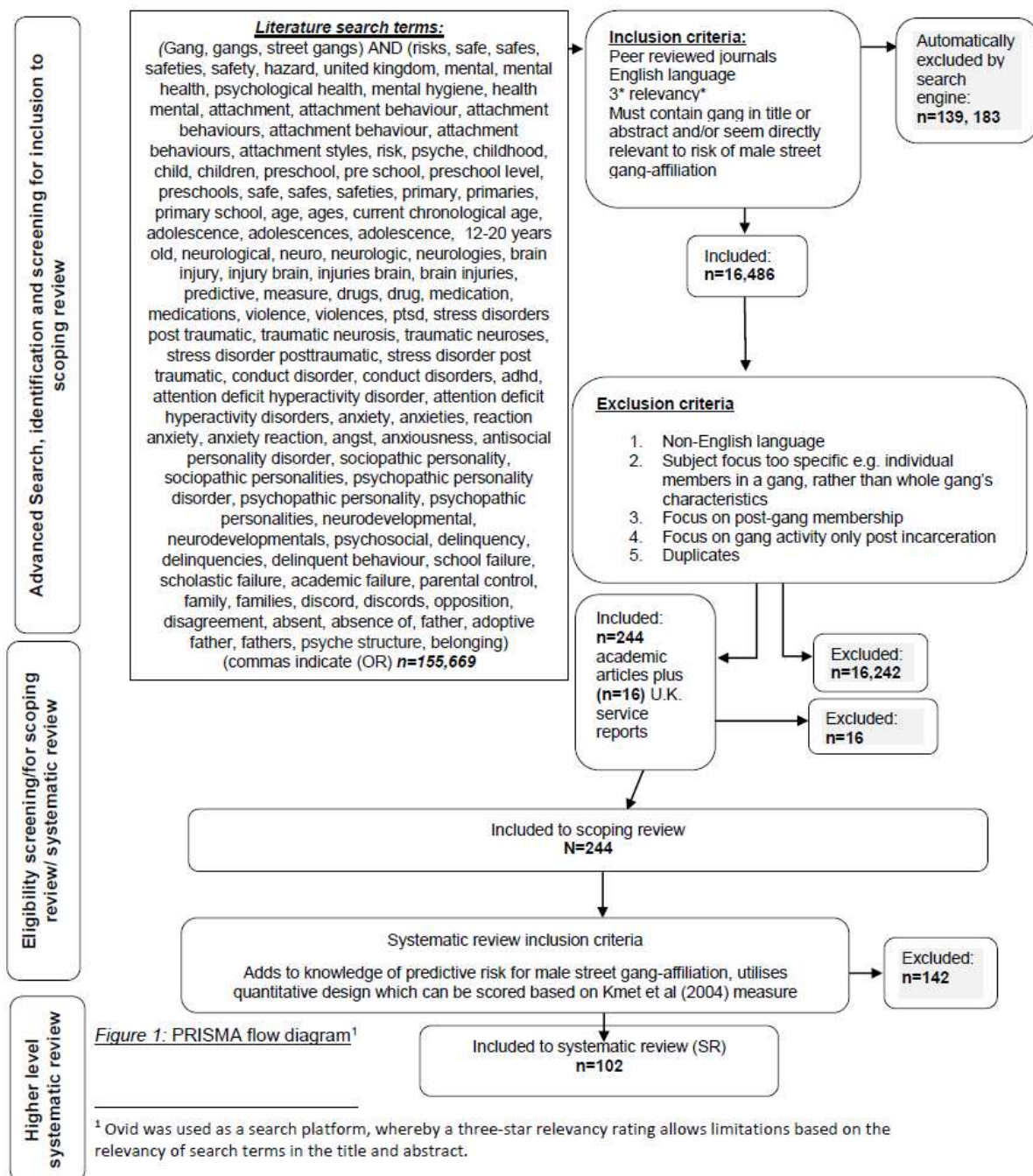
Final search terms were as follows: (Gang, gangs, street gangs) AND (risks, safe, safes, safeties, safety, hazard, united kingdom, mental, mental health, psychological health, mental hygiene, health mental, attachment, attachment behaviour, attachment behaviours, attachment behaviour, attachment behaviours, attachment styles, risk, psyche, childhood, child, children, preschool, pre school, preschool level, preschools, safe, safes, safeties, primary, primaries, primary school, age, ages, current chronological age, adolescence, adolescences, adolescence, 12-20 years old, neurological, neuro, neurologic, neurologies, brain injury, injury brain, injuries brain, brain injuries, predictive, measure, drugs, drug, medication, medications, violence, violences, ptsd, stress disorders post traumatic, traumatic neurosis, traumatic neuroses, stress disorder posttraumatic, stress disorder post traumatic, conduct disorder, conduct disorders, adhd, attention deficit hyperactivity disorder, attention deficit hyperactivity disorders, anxiety, anxieties, reaction anxiety, anxiety reaction, angst, anxiousness, antisocial personality disorder, sociopathic personality, sociopathic personalities, psychopathic personality disorder, psychopathic personality, psychopathic personalities, neurodevelopmental, neurodevelopmentals, psychosocial, delinquency, delinquencies, delinquent behaviour, school failure, scholastic failure, academic failure,

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parental control, family, families, discord, discords, opposition, disagreement, absent, absence of, father, adoptive father, fathers, psyche structure, belonging). Commas in the above search terms indicate use of (OR).

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PRISMA Flow Diagram



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Searches were conducted in PsycINFO, PsycARTICLES, Medline, the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews, and Social Policy and Practice databases, using the Ovid search platform (search conducted from the databases' inception to 03/04/15). Truncation was used to avoid overlooking papers using different spellings or terminology. N = 244 papers met the initial inclusion criteria. Full copies of these articles were acquired and included in the scoping review.

Papers written in a way that enabled scoring, utilised a quantitative design, and offered information on predictive risk issues for male street gang affiliation were extracted and included in the systematic review. This stage identified no papers using a randomised control design (RCT), no systematic reviews and n = 102 observational studies (of which n = 78 employed a cross-sectional design and n = 24 selected a cohort design utilising longitudinal data).

Data Extraction Process

Data were extracted based on Howell and Egley's (2005) six categories of risk, with subcategories created under these wider headings. A narrative synthesis, which summarises the findings and highlights emerging themes, follows.

Analysis

Quality of Studies

Le Bouillier et al. (2015) recommended tabulating the preliminary synthesis of scoping review papers prior to a systematic quality analysis. All papers in the scoping review were therefore tabulated. Data deemed essential for this review (author, research focus, population

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group, country research was conducted in, aim of study, methodology, measure used to determine gang affiliation, and findings with regard to risk phenomenon) were tabled.

Papers meeting the systematic review's inclusion criteria (see Figure 1) were extracted from this table and scored using Kmet, Lee & Cook, (2004) Quality Assessment Scoring Framework for Quantitative Studies. Kmet's 14-item checklist covers study design intervention, outcome measures and methods of analysis, and is frequently used for systematic health reviews (Shaw, McNamara, Abrams, Cannings-John, Hood, Longo, ... Williams, 2009). Furthermore, the succinct but rigorous nature of the checklist was considered appropriate, given the number of papers included in the review. A random sample of 62 out of the 102 studies were independently quality rated by a second assessor. The intraclass correlation between the assessors was 0.96, suggesting a high degree of inter-rater reliability. Table 1 shows a summary of the main criteria, and an explanation of scoring calculations. The complete results of individual scores can be found in in Appendix A.

The papers were then coded based on quality. With all things being equal, studies using longitudinal samples are arguably more robust than are cross-sectional designed studies (Farrington & Loeber, 2000) when predicting risks. Studies utilising a longitudinal sample were, therefore, accorded higher value. Papers not utilising a longitudinal cohort were coded hierarchically based on quality (see Table 2 for coding explanations).

A table of papers qualifying for systematic review were extracted from the tabled scoping review papers, and assigned quality codes were allocated (see Appendix B for scored papers) (see Appendix C for full tabling of these papers).

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Table 1

Kmet et al. 's (2004) Scoring Criteria and Explanations of Calculations for Quantitative Papers

No.	Questions for quantitative studies
1	Is the question or objective sufficiently described?
2	Is the design evident and appropriate to answer the study question?
3	Is the method of subject selection (and comparison group selection, if applicable) or source of information input variables (eg., for decision analysis) described and appropriate?
4	Are the subject (and comparison group, if applicable) characteristics or input variables information (eg., for decision analysis) sufficiently described?
5	If random allocation to treatment group was possible, is it described?
6	If interventional and blinding of investigators to intervention was possible, is it reported?
7	If interventional and blinding of subjects to intervention was possible, is it reported?
8	Are outcome and (if applicable) exposure measure(s) well defined and robust to measurement/ misclassification bias? And are means of assessment reported? ¹
9	Is the sample size appropriate?
10	Is the analysis described and appropriate?
11	Is some estimate of variance (eg., confidence intervals, standard errors) reported for the main outcomes and results (eg., those directly addressing the study question/ objective upon which the conclusions are based)?
12	Are confounding factors controlled for?
13	Are results reported in sufficient detail?
14	Do the results support the conclusions?
Total score	Total sum of scores are calculated by adding yes scores (2), partial scores (1) or no scores (0). Total possible sum is 28, and the summary score is calculated by adding the total score and then dividing by the total possible sum.

As papers explored a diverse range of issues, scoring item 8 was limited to measurement of gang membership rates as opposed to the inclusion of wider measures.

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Table 2

Explanation of Allocated Coding of Papers Included in the Systematic Review

Overall percentage score based on Kmet et al (2004)	Utilised longitudinal cohort?	Quality Code	Explanation
90% or over	Yes	C1	High level paper, utilising a longitudinal cohort
70%-90%	Yes	C2	Medium level paper, utilising a longitudinal cohort
50%-70%	Yes	C3	Medium-Low paper, utilising a longitudinal cohort There were no low quality studies using a longitudinal cohort
90% or over	No	C4	High level paper, non-longitudinal cohort
70%-90%	No	C5	Medium level paper, non-longitudinal cohort
50%-70%	No	C6	Medium-low level paper, non-longitudinal cohort
50% or below	No	C7	Low level paper, non-longitudinal cohort

Identification of Risk Areas

Risk areas were extracted from the systematic review papers based on the six areas outlined previously. Patterns of risks were then identified according to the coded quality of the data. The findings have been communicated successively to the reader under generic risk areas, in the sequential order of the quality of the coded evidence (C1-C7) (for the full coded risk table, see Appendix D). When there was no evidence of specific risks under a coded category, it was not mentioned. If controversy arose within the analysis, the merits and shortcomings of individual studies were discussed to guide the level of confidence that could be assigned to

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the identified area. A diagrammatic explanation of the strategy for reviewing risk findings can be seen in Appendix E.

Design Types

Due to the volume of papers, and because many quality issues are shared across predictors, a generic critique will be discussed prior to reviewing individual risk predictors. For a full summary of the scored strengths and weaknesses of the systematic review papers in which this is based, see Table 3.

Selected study designs.

Seventy-eight studies were cross-sectional. These studies frequently referred to the risks that were ‘predictive’ of gang-affiliation. Although they were able to classify risks as predictor variables, they could not necessarily infer causation, except in the case of time-irrelevant risk areas such as sex and ethnicity, which remained constant. Cross-sectional studies observed a data set at one point in time to describe specific features within a population (Lindell & Whitney, 2001). These studies were mainly retrospective in nature, and therefore recall bias and a lack of generalisability were particular criticisms (Feldman & McKinlay, 1994).

Twenty-four studies utilised longitudinal samples and adopted a cohort design, allowing for the identification of predictive risk variables. Whilst cohort studies allow for increased insight into the phenomenon under observation over time (Rochon, Gurwitz, Sykora, Mamdani, Streiner, Garfinkel & Geoffrey, 2005), as none of these studies included random allocation to groups (probably due to ethical or pragmatic barriers), causation could not be proved.

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Table 3

Overall Strengths and Weaknesses of Studies Included in the Systematic Review

No.	Questions for quantitative studies	Number of papers meeting criteria	Number of papers partially meeting criteria	Number of papers not meeting criteria	Number of papers where this is deemed not applicable
1	Is the question or objective sufficiently described?	70	31	1	0
2	Is the design evident and appropriate for answering the study question?	71	31	0	0
3	Is the method of subject selection (and comparison group selection, if applicable) or source of information input variables (such as for decision analysis) described and appropriate?	64	37	1	0
4	Are the subject's (and comparison group, if applicable) characteristics or input variable information (such as for decision analysis) sufficiently described?	54	35	13	0
5	If random allocation to a treatment group was possible, is this described?	0	0	0	102
6	If interventional and blinding of investigators to intervention was possible, is this reported?	0	0	0	102
7	If interventional and blinding of subjects to intervention was possible, is this reported?	0	0	2	100
8	Are outcome and (if applicable) exposure measure(s) well defined and robust to measurement/ misclassification bias? Are the means of assessment reported?	11	77	14	0

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9	Is the sample size appropriate?	67	27	7	1 (unclear)
10	Is the analysis described and appropriate?	56	37	9	0
11	Is some estimate of variance (confidence intervals, standard errors) reported for the main outcomes and results (those directly addressing the study question/objective upon which the conclusions are based)?	48	11	42	1
12	Are confounding factors controlled for?	37	27	37	1
13	Are the results reported in sufficient detail?	77	20	5	0
14	Do the results support the conclusions?	80	21	1	0

Whilst observational studies play an essential role in determining whether investment in more expensive and challenging experimental studies is warranted, they intrinsically lack the ability to draw causal conclusions. Furthermore, they frequently lack power, are deficient in terms of the inclusion of randomised sampling, and fail to control for confounding factors through statistical analysis. This can lead to findings being rendered invalid or not generalisable (Boccia, Galli, Gianfagna, Amore, & Ricciardi, 2010).

Samples.

The processes of participant selection were described fully in 64 of the papers, partially in 37 of the papers and not at all in one paper. Overall, the papers were quite strong in this domain. However, where weaknesses occurred, a consideration of the effect of sampling on later results was not possible. Sample sizes were deemed sufficient in 66 of the papers. In 27 of the studies, this was partially true and sample sizes were deemed inadequate in only seven

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papers. Although the risks identified were still extracted, generalisation from the findings of lower quality papers was difficult, and determining the robustness of the results was problematic.

Participants' characteristics were reported upon in 54 papers, and the subjects' characteristics were reported on partially in 35 papers. In 49 papers, the participants' characteristics were further supported via the full reporting of estimates of variance (which was also the case for 11 papers to some degree). However, 13 papers did not report on participants' characteristics at all. Furthermore, the investigatory nature of some studies meant that a control group was unnecessary. In these studies, it was impossible to reflect on whether the risk variables identified would have presented in a sample group with different demographics. That 48 papers failed to include an estimation of variance led to additional challenges when striving to communicate risk generalisations.

Measures.

Whilst there is currently no consensus on the definition of gang-affiliation due to the heterogeneity of gang structures (Coid et al., 2013), only 11 studies used relatively robust tools such as the Eurogang definition (Weerman et al., 2009) or the Gang Membership Inventory (Pillen, Hoewing-Roberson, & Renee, 1992). Esbensen, Winfree, He and Taylor (2001) and Klein (1995) offered evidence of pragmatic questioning and self-reporting being sufficient to determine gang-affiliation, and 77 studies used this approach. 14 studies did not report on their method of identification of participants' gang-affiliation at all, making it unclear how they clarified participants' gang-affiliated status. In these cases, the interpretation of risk variables could only be tenuous.

Controlling for confounding factors.

Most cross-sectional papers of C4-C7 quality involved samples who were retrospectively reflecting on risk exposure, potentially introducing reporting bias. Due to the multitude of potentially confounding factors (such as cultural variation, sociopolitical and socioeconomic variables, availability of state and voluntary support services, community disorganisation and levels of gang presence to name but a few), this reduced the confidence in some results, particularly given the transnational nature of the selected papers. Whilst 37 studies did not control for confounding variables at all, 27 partially met this criteria, and 37 papers fully controlled for confounding factors. (one paper couldn't be scored on this criteria). Given the variability in the locations of the studies (see end table in Appendix C), the results of weaker studies could only allow conclusions and the generalisability of findings to be shared with partial confidence.

Analysis.

Analytic approaches were appropriately selected and described in 56 cases. Thirty-seven papers partially met this criteria, and nine did not. For the most part, the selected analytic procedures were comprehensive, but were often not described at the level of detail that would allow a full critique. In papers scoring lower in this area, it was impossible to ascertain how the results were supported by the analytic processes, limiting confidence in the findings.

Reported results.

Results and conclusions were reported in sufficient detail by 77 of the papers, with 20 papers only partially meeting this criteria, and five failing to do so. Identification of risk patterns was for the most part comprehensive, and the extraction of risk was feasible. Where this was more

complex, inter-rater discussions and re-reading of papers led to this being possible. Some of the above points will be drawn upon further when the findings are reviewed in detail.

Results

For the full scoring of papers included in the systematic review, see Appendix B. For the tabled findings from the systematic review papers, see Appendix C. See Appendix D for how these relate to risk areas. Below, the findings have been extracted using Howell and Egley's (2005) six categories of risk, with sub categories created under these wider headings. The quality of findings is commented upon, and then summarised in tabular format.

Cumulative Risk

Whilst few papers identified independent relationships between an accumulation of risks and gang affiliation, consistent results emerged from these studies. Evidence from medium and medium-low quality longitudinal studies suggested that cumulative risk does present an independent, predictive risk variable, but that this is mediated by pre-teen stress exposure, poverty and ethnicity. Evidence from a medium cross-sectional level paper suggested that it was the cumulative nature of multiple risks that separated individuals at risk of offending from those at risk of gang affiliation. However, it should be noted that causation cannot be confirmed in the C5 findings due to the cross-sectional nature of the study designs. See Table 4 for an overview of findings in this domain.

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Table 4

Evidence Pertaining to Cumulative Risk

Area of Risk	Quality code	Authors	Summary of findings
Cumulative risk	C2	Eitle (2004)	Cumulative risks present a significant independent risk; mediated by race, family, financial difficulties and pre-teen stress exposure
	C3	Hill et al (1999)	Gang-affiliated young people exposed to ≥ 7 risk factors were thirteen times more likely to become gang-affiliated than young people exposed to one, or no risk-factors.
	C5	Esbensen, Peterson, Taylor & Frenz (2009)	Whilst gang members and violent offenders often shared generic risks, it was the cumulative nature of these risks which offered an independent route towards gang affiliation.

Family

There was clear evidence of parenting and familial relationships influencing gang-affiliation. Studies using longitudinal data suggested that low parental supervision, familial gang involvement and poverty were predictive variables (in addition to evidence of a genetic route). This was widely supported across the literature. However, there was some discrepancy within the cross-sectional studies with regard to how much impact familial criminality had on individual delinquency (Sirpal, 2002; Kakar, 2005). Sirpal (2002) controlled for gang affiliation when analysing the findings, and subsequently found that gang-affiliation facilitated delinquency independently of familial influence. As neither of these studies employed longitudinal data, it could have been that the influence of familial criminality would have featured in Sirpal's (2002) population at an earlier date, and that Kakar (2005)

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may have discovered the relationship to be less strong if gang-affiliation had been controlled for. It was impossible, given the design of these studies, to draw clear causal conclusions or make suggestions concerning the directionality of these relationships over time.

The cross-sectional papers suggested an association between gang affiliation and difficult family dynamics, abuse (sexual, physical, emotional and neglect), and also running away from home. However, due to the design of these studies, it was not possible to determine the directionality of these risk relationships. Although Brownfield (2003; see also C5) found that attachment was not significantly correlated with gang-affiliation, measures of attachment in this paper were not validated, and confounding factors were not controlled for. An overall summary of risks related to this domain can be seen in Table 5.

School

From the consistent findings above, it appeared that school issues presented risks of gang-affiliation. Papers employing a longitudinal design suggested a predictive relationship for gang-affiliation arising from school failure and low academic performance. Cross-sectional studies showed an associated risk between gang-affiliation and perceived academic performance, commitment to school, negative relationships with teachers, and suspension from school. However, some papers did not control for confounding factors and, with a likely overlap between variables, directionality is difficult to determine. Overall risks related to school can be seen in Table 6.

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Table 5

Evidence Pertaining to Risks Arising from Family Factors

Area of Risk	Quality code	Authors	Summary of findings
Family			
Genetic	C1	Beaver et al. (2009)	There is a genetic predisposition to gang involvement. In particular, presence of the MAOA gene appeared to increase risk for later gang affiliation.
	C2	Barnes et al. (2012) Krohn et al. (2011)	Genetic factors were identified, and environmental factors could be uniquely experienced based on genetic make-up. The interaction of these could lead to gang affiliation. Gang involvement can relate to economic hardship and family problems in adulthood. These failures in the economic and family realms, in turn, contribute to involvement in street crime and/or arrest in adulthood
Parental supervision	C1	Lahey et al., (1999) Pyrooz (2015)	Poor parental supervision was a predictive factor for gang involvement.
	C4	Alleyne & Wood, (2011) Pederson (2014)	Poor parental supervision was associated with gang involvement.
	C5	Ngai et al. (2007) Yoder et al. (2003)	Poor parental supervision and less parental monitoring was associated with gang involvement.
Relationships with parents	C3	Hill et al. (1999)	Family relationships were associated with gang affiliation.
	C4	Brownfield (2003)	Parental attachment wasn't a significant correlate of gang membership, but the

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			value of positive parental relationships reduced risk of gang affiliation.
	C5	Walker-Barnes & Mason (2001) Li et al. (2002) Friedman et al. (1975) Hope & Damphousse (2002)	Parenting behaviour predicted gang involvement; even after controlling for peer influences. Strong family involvement acted as a protective factor for gang affiliation. Risk-factors for gang affiliation were identified as difficult relationships with parents, low parental monitoring and parental 'deviance.' Growing up in 'broken homes' was associated with gang affiliation.
	C6	McDaniel (2012) Freng et al. (2012) Wang et al. (1994) Danyko et al. (2002) Florian-Lacy et al. (2002) Lui & Fung (2005) Lachman et al. (2013)	Parental coping skills and monitoring appeared negatively associated with gang-involvement. Gang members reported significantly less parental monitoring and higher levels of perceived parental deviance. Gang members could name fewer role models than non-gang members. Absence of positive parent was predictive of gang membership. Growing up in foster care was associated with gang affiliation. Being in single-parent households with no positive male role model was associated with gang affiliation. The void created by poor family relationships is actively filled by the sense of gang 'belongingness'. Individuals who joined gangs for a sense of belonging were less involved in antisocial behaviour than those who joined for instrumental purposes
Parental abuse	C4	Thompson & Braaten-Antrum (1998)	Maltreatment (physical and sexual abuse) was the most significant indicator of gang affiliation, independently increasing risk four-fold
	C5	Yoder et al. (2003)	Gang-affiliated individuals had been exposed to frequent and severe abuse,

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			and had more frequently run away from home than control groups
	C6	Danyko et al. (2002)	Maternal substance abuse was a risk factor
Other areas	C1	Lahey et al. (1999) Pyrooz (2015) Pyrooz (2014) Gilman et al. (2014)	Being raised in a low income family was predictive of gang affiliation. Low educational attainment was predictive of gang affiliation. Parental gang involvement was predictive of gang affiliation
	C5	Baskin et al. (2014) Friedman et al. (1975) Farmer & Hairston (2013) Yoder et al. (2003) Kakar (2005)	Youth who experience less distress will benefit more from family belongingness. Being raised in a low income family was associated with gang affiliation. Having a parent or close relative die in the last year was associated with gang affiliation. Family involvement in criminal activity was associated with gang affiliation. Individual gang membership independently correlated with delinquency, beyond the effects of having delinquent criminal family members.
	C6	Sirpal (2002) Salaam (2011)	Parental criminality enhances gang membership, and delinquency. There's a correlation between large families and gang involvement.

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Table 6

Evidence Pertaining to Risks Arising from School Related Factors

Area of risk	Quality code	Authors	Summary of findings
Family	C2	Dishion (2005; 2010)	School related factors were associated with gang affiliation.
	C3	Hill et al. (1999)	Found an associated impact of school related factors on gang affiliation.
	C4	Alleyne and Wood (2011)	Levels of commitment to school were associated with gang involvement.
	C5	Ngai et al. (2007)	Negative attitudes to teachers featured as a risk.
	C6	Farmer & Hairston (2013) Yoder et al. (2003)	Suspension from school was frequently seen in the profiles of gang-affiliated individuals.
	C7	Dukes et al.(1997)	Perceived academic ability related to gang affiliation.

Individual

Due to the volume of findings in this section, a discussion of each risk presented within this category will be provided.

Antisocial behaviour.

There was support for antisocial behaviour being a predictive risk variable from studies employing a longitudinal design; however, these studies also revealed that gangs played a facilitative role for increased violence. Other predictive risks included difficulties in perspective taking, lack of responsibility and weak prosocial bonds. The reduced self-control, hyperactivity, inattention, low morality, angry ruminations and poor interpersonal skills

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identified in cross-sectional studies might explain why prosocial bonds were difficult to maintain for this group. Social difficulties could be exacerbated by a transfer from primary school to secondary school at an age at which individuals are considered particularly vulnerable to gang-affiliation. Pyrooz (2014) supported that being between the ages of 13 and 15 was a predictive risk for gang-affiliation.

Gang-affiliated individuals appeared to hold hostile attitudes towards authority; however, the review identified a complex interplay of factors that could confound this finding relating to ethnicity and social class, and to historic relationships with the police in particular. Gangs were proved to act as facilitators for increased violence, and individuals were exposed to further violent victimisation through gang involvement.

Drugs.

Drug use did not appear to be correlated with gang-affiliation when explored longitudinally. However, gangs were found to facilitate increased drug use post-gang affiliation, and overall involvement in gangs impacted on lifetime substance use (especially with regard to marijuana).

Ethnicity.

The transnational nature of the studies included for this review made it particularly difficult to draw conclusions about the risk presented by 'ethnicity'.

It appeared that being Black, Asian or from an ethnic minority (BAME) was a predictive risk; however, this was confounded by a myriad of additional factors (such as historic relationships with the police, stop-and-search experiences and higher arrest rates, which were more closely related to ethnicity than they were to gang-affiliation). The literature also suggested that the

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ethnicity of gang-affiliated individuals merely reflected the demographics of the area in which the research was conducted, and was not a unique risk indicator.

Poverty.

Economic disadvantage was identified as a predictive risk. It was further suggested by the wider literature that gang-affiliation may appear to be an effective way of achieving financial gain in the eyes of vulnerable young people (who are also identified as having had limited opportunities to succeed financially through traditional means). However, being a gang member impacted negatively on the individual's ability to secure employment and financial security upon desisting, creating a vicious cycle.

Psychological difficulties.

This analysis unanimously demonstrated high psychological distress in this cohort. Although low self-esteem was the only predictive risk in this area, high-quality cross-sectional studies showed additional associations between gang-affiliation and PTSD, anxiety and depression. There was some conflict in the findings with regard to rates of suicidal ideation and suicide attempts. Coid et al. (2013) found depression and suicide attempts to be lower in gang-affiliated individuals when other variables were controlled for. Evans, Albers, Macari & Mason (1996) also found rates to be lower in their gang-affiliated group. However, Yoder (2003) disagreed. Upon closer examination, Yoder, Whitbeck & Hoyt (2003) utilised a sub-sample of gang-affiliated individuals who had run away from home or who were homeless. They were also found to have been severely abused. Unlike Coid et al.'s (2013) paper, Yoder (2003) did not control for any confounding variables, and used a smaller sample size, which did not allow for the complex modelling offered by Coid et al. (2013). Evans et al. (1996) found that, although suicidal rumination and attempts were lower in their gang-affiliated group, if gang members had been abused (particularly sexually), they were at increased risk

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of suicidal ideation and active suicide attempts. The difference in the finding by Yoder et al. (2003) can thus be explained by the utilisation of a biased sample and lack of controlling for confounding variables that might have led the group to run away from home, or to which individuals were exposed whilst homeless.

Overall summary.

The lack of control groups, descriptions of sample recruitment, demographic breakdowns and controlling for confounding factors in some studies made extrapolating risks in this domain particularly difficult. Furthermore, without clear directionality between risk phenomenon and gang affiliation, it was impossible to draw generalisable conclusions. The strongest line of narrative from the higher quality papers in this section appears to be that gang-affiliated individuals had difficulties with interpersonal skills and had low self-esteem. Although mental health symptoms were suggested, whether these were intrinsic, consequential to gang affiliation, or both intrinsic and exacerbated by gang-affiliation, was unclear. However, it appeared evident that gang affiliation created obstacles to future employment and facilitated further violence, exposure to violence and drug use. The summarised risks related to the individual can be seen in Table 7.

Peers

The evidence summarised in Table 8, offers uncontested support for the impact of peer influence on gang affiliation. Spending time with anti-social peers was a predictive risk indicator, and peer gang-affiliation was an associated risk factor identified in cross-sectional studies. In line with previous findings, closer analysis revealed a potential social skills deficit in this group.

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Table 7

Evidence Pertaining to Risks at an Individual Level

Area of risk	Quality code	Authors	Summary of findings
Individual			
Antisocial behaviour and relationship difficulties	C1	Lahey et al. (1999) Dmitrieva et al. (2014)	Low responsibility, antisocial behaviour, conduct disorder symptoms and difficulties in perspective taking are identified as predictive risk factors for gang affiliation.
	C2	Dishion et al. (2005) Weerman et al. (2015) Barnes et al. (2010) Weerman et al. (2015) Gatti et al. (2005)	Identified and associated risk between antisocial and conduct disordered behaviour and gang affiliation. Antisocial behaviour was exacerbated by gang affiliation. Weak conventional bonds were associated with gang affiliation. The need to belong is associated with gang affiliation.
	C3	Craig et al. (2002) Zhang et al. (1999)	Increased fighting behaviour, hyperactivity, inattention, oppositional behaviour, and self-reported delinquent activities are noted in gang-affiliated cohorts and peers rated them as more aggressive than non-gang affiliated peers. Antisocial behaviour was further facilitated by gang affiliation.
	C4	Alleyne & Wood (2013) Pederson (2014)	Moral disengagement and weak prosocial values were associated with gang affiliation. Anti-authority attitudes were associated with gang affiliation.
	C5	Griffin & Hepburn (2006) Hope & Damphousse (2002) Yoder et al. (2003)	Gang affiliation was associated with violence. Antisocial behaviour/ gang association link. Antisocial behaviour/ gang association link. Low control and low morality was associated with gang affiliation. Individuals did not have higher rates of antisocial behaviour than control

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		<p>Ngai et al. (2007)</p> <p>Thornberry et al. (1993)</p> <p>Melde & Esbensen (2011)</p> <p>Friedman et al. (1975)</p> <p>Egan & Beaderman (2011)</p> <p>Alleyne & Wood (2010)</p> <p>Lurigio et al. (2008)</p> <p>Kakar (2008)</p> <p>Brownfield et al. (2001)</p> <p>Harper et al. (2008)</p> <p>Lyon & Hall (1992)</p>	<p>groups prior to gang membership, and that upon desisting from gang-involvement antisocial behaviour decreased. Gang involvement affects emotions, attitudes and social controls in ways that increase antisocial behaviour. Aggression was linked to the degree of gang embeddedness and antisocial behaviour. Gang-affiliated individuals displayed anti-authority attitudes. Gang-affiliated individuals were more likely to blame their victims, have negative attitudes to the police and have anti-authority attitudes. Gang-affiliated individuals were more likely to have been stopped and searched, and arrested. Arrest rates in this group were linked to ethnicity and social class; when controlling for gang membership. There was an association between the degree of gang embeddedness and anti-social behaviour.</p>
	C6	<p>Salaam (2011)</p> <p>McDaniel (2002)</p> <p>Bsiwas (2011)</p> <p>Olate et al. (2012)</p> <p>Vasquez et al. (2012)</p> <p>Corcoran et al. (2005)</p> <p>Curry & Spergal (1992)</p> <p>Kissner et al. (2009)</p>	<p>Correlations between police corruption and gang affiliation, gang affiliation and antisocial behaviour, and rumination and gang embeddedness were identified in these papers.</p> <p>Anti-social behaviour was the only variable dividing gang members from non-gang members, after controlling for mental health. Lack of social control is not significant. Gangs offered a facilitative role in antisocial behaviour.</p>
	C7	<p>Dukes et al. (1997)</p>	<p>Negative attitudes to institutions were considered to be associated with gang affiliation.</p>
Drug use	C2	<p>Gatti et al. (2005)</p> <p>Bjerragaard (2010)</p> <p>Weerman et al. (2015)</p>	<p>Gang involved individuals had higher substance use. Gangs facilitated increased alcohol and drug use.</p>

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	C3	Zhang et al. (1999)	Drug use is exacerbated by gang affiliation.
	C5	Thornberry et al (1993) Yoder et al. (2003) Volkmann et al. (2013) Valdez et al. (2006) Harper et al. (2008)	Individuals did not have higher rates of drug use prior to gang membership, and gang-involvement was directly correlated with increased alcohol and drug use. Gang affiliation was associated with drug scene familiarity and increasing levels of substance use. Drug use interacted with an individual gang member's risk for violence to affect violent behaviour outcomes. Once gang-affiliated, increased alcohol and marijuana use was sustained over a lifetime.
	C6	McDaniel (2002) Danyko et al. (2008) Lyon & Hall (1992) Sirpal (2002)	Alcohol and drug use are linked to gang affiliation. Parental criminality and drug use enhanced gang membership, drug use and delinquency
Ethnicity	C1	Tapia (2011) Pyrooz (2015)	Gang membership, racial minority status and their interaction, each increase the risk of arrest. Youth gang members were disproportionately male, black, Hispanic
	C2	Esbensen & Carson (2012)	Ethnicity was not significantly related to gang affiliation, over time, and was considered more likely to be associated with compounding variables.
	C3	Pyrooz, Sweeten & Piquero (2012) Winfrey et al. (2001)	Hispanic and Black individuals were associated with greater continuity in gang-involvement when studied longitudinally. The correlation between gang affiliation and ethnicity was likely to be mediated by a variety of complex and compounding variables.
	C4	Alleyne & Wood (2011)	The ethnicity of gang-affiliated individuals merely reflected community demographics, and wasn't deemed to be of unique significance.

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	C5	Brownfield et al. (2001) Hope & Damphousse (2002)	Although ethnicity interacted with arrest rates (with Black and 'lower class' individuals being arrested more frequently) this wasn't considered related to gang affiliation. Gang members are more likely to be non-white
Need for protection/ violent victimisation	C2	Melde et al. (2012) DeLisi (2009) Barnes et al. (2012)	Although some individuals are motivated to join gangs for protective purposes, they are subsequently exposed to increased violent victimisation; even when personal characteristics have been controlled for. Post gang-affiliated victimisation was related to increased gang membership over time
	C4	Katz et al. (2011) Rufino et al. (2000) Coid et al. (2013)	Historic violent victimisation was strongly correlated with gang involvement. This relationship remained constant, even when gang affiliation had been controlled for. Gang-affiliated individuals tended to be alone and under the influence of substances when assaulted. Gang-affiliated individuals frequently feared further violence, and had high mental health needs; particularly trauma symptomology
	C5	Lurigio et al. (2008) Taylor et al. (2008) Yoder et al. (2003)	Gang-affiliated individuals feared further violence. Historic violent victimisation was strongly correlated with gang-involvement
Poverty (and need for social status)	C1	Dmitrieva et al., (2014)	Individuals are motivated to join gangs in order to increase self-esteem.
	C2	Melde et al. (2012) Krohn et al. (2011)	Low social status was a risk associated with gang affiliation, and although individuals are motivated to join gangs for financial gain, economic hardship

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			additionally increased subsequent to gang affiliation.
	C4	Alleyne & Wood (2013)	A desire for increased social status acted as a motivator for gang affiliation.
	C5	Alleyne & Wood (2010) Farmer & Hairston (2013) Friedman et al. (1975) Hope & Damphousse (2002) Lyon & Hall (1992)	A desire for increased social status acted as a motivator for gang affiliation. Gang-affiliated individuals had historically been in receipt of free school meals, had less opportunity for success, and had been raised in a lower socioeconomic environment. Gang-affiliated individuals appeared less socially mature, and sought social status gain as a reaction to growing up in poverty.
	C6	Salaam (2011)	Gang membership seemed to emerge as a functional attempt to 'improve their lot in life.'
Psychological difficulties	C1	Dmitrieva et al. (2014)	Low self-esteem predicted gang membership.
	C4	Coid et al. (2013) Coid, (personal communication, 2015)	Trauma symptomology was associated with gang-affiliation. In a cross-sectional study of 4, 664 men between the ages of 18 and 34 in Great Britain, a higher rate of antisocial Personality Disorder (APD), anxiety and psychotic disorders were identified in the gang-affiliated group. This was hypothetically explained to be mediated through untreated post-traumatic stress disorder (PTSD). Once offered help, gang-involved participants were more likely to use services than a non-gang affiliated cohort. Lower rates of depression were found in gang involved men
	C5	Friedman et al. (1975)	Low self-esteem predicted gang membership. Higher rates of suicide were

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		Yoder (2013) Farmer & Hairston (2013) Li et al. (2002)	found in gang-affiliated men. Gang affiliation is correlated with generic psychological difficulties.
	C6	Corcoran et al. (2005) Evans (1996) Harper et al. (2008) Danyko et al. (2002) Florian-Lacy et al. (2002) Biswas et al. (2011) Olate et al. (2012) Valdez et al (2000)	Gang members report more mental health symptoms, and this is a key discriminating factor between gang members and non-gang members. Gang-affiliated individuals experienced less suicidal ideations and suicide attempts than control groups. Depression and anxiety were found to be associated with gang affiliation. PTSD is a disorder experienced by gang involved participants. Low self-esteem predicted gang membership. Gang members had a sense of foreshortened future which could be symptomatic of PTSD. Gang members had a lower psychopathy score than a forensic group but greater than the control group.
	C7	Corcoran et al. (2005) Dukes et al. (1997)	Higher mental health symptoms, externalised behaviour and ‘thought problems’ were found in gang members than control groups. Low self-esteem predicted gang membership
Other features	C1	Pyrooz (2014)	Individuals are particularly at risk of gang involvement between the ages of thirteen and fifteen years
	C5	King et al. (2013) Friedman et al. (1975)	Gang membership was correlated with ‘risky sex’ and ‘thrill seeking’ and gang members were found to have less opportunities for success.
	C6	Biswas et al. (2011) Palmer & Tilley (1995)	Gang membership was correlated with ‘risky sex’
	C7	Brooks et al. (2011)	Gang membership was correlated with ‘risky sex’

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Table 8

Evidence Pertaining to Peer Related Risks

Area of risk	Quality code	Authors	Summary of findings
Peers	C1	Lahey et al. (1999) Dmitrieva et al. (2014)	Antisocial peers posed a significant influence in individuals becoming gang involved.
	C2	Weerman et al. (2015) Evans et al. (1999)	Antisocial peers posed a significant influence in individuals becoming gang involved. Urban students significantly more likely to report having peers in gangs.
	C4	Alleyne & Wood (2011)	Antisocial peers posed a significant influence in individuals becoming gang involved.
	C5	Farmer & Hairston (2013) Yoder et al. (2003) Walker-Barnes & Mason (2001) Friedman (1975) Kakar (2005)	Gang members had historically been rejected by peers. Gang members had friendships with 'deviant peers'. Gang members had been friends with gang involved individuals. Gang members were frequently motivated to join gangs to satisfy their need for companionship with heterosexual males.
	C6	Chu et al. (2011) Lui & Fung (2005)	In regard to their criminological need profile, it was argued that gang and non-gang couldn't be differentiated, except in respect to peer delinquency levels. Anti-social peers provide belonging and fill the void left by families.

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Community

Being raised in urban, antisocial or socioeconomically deprived environments was predictive of gang-affiliation. Communities with highly visible gang presence presented as an associative risk of gang-affiliation. The perception of these environments was found to be understandably threatening, which acted as an additional associative risk.

Gang affiliation seemed to be motivated by seeking protection. However, evidence demonstrated that being gang-affiliated further increased violent victimisation and homicide. Risks related to community factors can be seen in Table 9.

Table 9

Evidence Pertaining to Risks in the Community

Area of risk	Quality code	Authors	Summary of findings
Community	C1	Pyrooz (2014) Gilman et al. (2014)	Growing up in urban, antisocial, socially disadvantaged areas, predicted gang affiliation.
	C3	Hill et al (1999) Dupure et al. (2007)	Community environments have a significant impact on gang affiliation, especially where there is community instability.
	C4	Alleyne & Wood (2013) Evans et al. (1999)	The presence of gangs, and perceived threat to personal safety in the community correlated with gang involvement
	C5	Luyt & Foster, 2001 Farmer & Hairston (2013) Friedman et al. (1975)	The presence of gangs and perceived threat to personal safety in the community correlated with gang involvement. There was an association between individual perceptions of communities as dangerous and subsequent gang affiliation. Gang affiliation motivation arose from a perceived need for safety, and protection

(C6)	Cadwallader & Cairns (2002) Salaam, 2011	The community environment impacted upon the social development of young people who later become gang involved. Rural and urban migration were associated with gang involvement
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Discussion

This study aimed to undertake a systematic review of the literature in order to search for predictive risks of male gang-affiliation. This section will begin with a discussion of the strengths and limitations of the papers included, and will subsequently consider the overall findings.

Strengths and Limitations of Studies

Due to the intrinsic designs of the studies included, only those utilising longitudinal sample groups could reliably report on predictive risks, and no studies could offer clarity with regard to causation. However, associated risks emerging from cross-sectional studies were useful in interpreting the findings. Although there were many areas with strong support from high-quality papers, weaknesses in reporting on sampling selection, participant characteristics, estimations of variance and measures employed to determine gang affiliation led to concerns about the generalisability of findings in other areas. Furthermore, given the likely cross-over of risk variables, the directionality of risks was impossible to comment upon, particularly in studies that failed to control for confounding factors.

Although the internal or external validity of the findings may have been compromised (Boccia et al., 2010) by the weaknesses outlined, there were papers that offered robust evidence of risk areas, and the overall consistency of risk patterns that emerged allowed for increased confidence in the reliability of the results. Evidence in this study supported

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previous research findings (Esbensen & Huzinga, 1993; Thornberry et al., 1998; Hill, Howell, Hawkins & Battin-Pearson, 1999), highlighting that gang-affiliated individuals are a highly vulnerable group, affected by multiple risk factors in their early years. This study also supported Howell and Egley's (2005) findings that gang-affiliated individuals were exposed to risks across multiple domains.

Overall findings

Overall findings will be discussed using Howell and Egley's (2005) developmental model of gang-affiliation (from preschool to mid-adolescence), as the results suggest a cumulative developmental risk narrative (although as stated previously, directionality was unclear).

Preschool.

Evidence suggested that biological and environmental predictive risks could be identified in gang-affiliated individuals (genetic predisposition to aggression, low parental supervision, familial gang involvement and poverty). Furthermore, associated risks were detected (parental neglect and abuse), which would suggest early developmental trauma exposure. This could have impacted on the learning of prosocial interpersonal skills and emotional regulation (Schor, 1994, 2001, 2003, 2005) which would ordinarily have been taking place during these years.

School entry - later childhood.

With regard to school aged social relationships, this review demonstrated that gang members had experienced early rejection by pro-social peers and developed anti-social peer bonds, both of which serve as predictors for gang affiliation (together with difficulties with perspective taking and lack of responsibility). Seeking out friendships with anti-social peers might have been a functional way of belonging to a more accepting group by school age.

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Melde, Taylor & Esbesen (2009) and Grant and Feimer (2007) considered that gangs acted as an alternative socialisation process by providing acceptance and belonging. However, association with antisocial peers then becomes a risk predictor in itself.

With regard to academic ability, early interpersonal trauma or neglect can result in the type of developmental difficulties that can impair academic concentration and performance (Schore, 2003). The impact of early familial risk exposure, and subsequent individual traits identified in cross-sectional studies (such as low morality, inattentiveness, angry ruminations and hyperactivity), are likely to have contributed to the low academic performance identified as a predictive risk variable in gang-affiliated individuals.

Associated risks (such as low commitment to school) could be partially explained by low levels of parental supervision (such as input concerning homework) or low parental education (making it difficult for parents to support their children effectively in this area). Both low levels of parental supervision and low parental education are identified as unique, predictive risk areas. Remaining associated factors (perceived low performance and poor relationship with teachers) could be explained by low self-esteem and antisocial behaviour, both of which were also found to be independent predictive factors.

Early adolescence - mid-adolescence and post-gang affiliation.

School suspension was identified as an associated factor for gang-affiliation, and potentially resulted in increased exposure to antisocial, deprived and unstable communities (which are each independent predictive factors) with an overt gang presence (an associated risk).

Cumulative risk exposure appeared to result in a desire to belong, to increase social status, to secure financial independence and to be protected. At a developmental age at which individuals are attempting to develop independence and autonomy, and without protective

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factors in place (such as adequate adult supervision, positive friendship networks or proactive steps taken by the state to safeguard individuals), gangs can appear to offer security and protection in an otherwise threatening environment.

Evidence demonstrated that (post-gang involvement) gangs acted as facilitators for increased drug use, antisocial behaviour, exposure to violence and violent assault; often thwarting

alternative routes to success and autonomy in the future, making desistance difficult, and creating increased psychological harm. This supports previous findings by Barnes et al. (2012), and by DeLisi et al. (2009).

Limitations

There were limitations to this study. No risk of bias for individual studies was considered or included in this review. Only partial extraction of information was conducted, due to the quality appraisal tool utilised and the needs of this review; papers in languages other than English were excluded due to lack of financial capacity for translation.

Furthermore, wide inclusion criteria created challenges when attempting to compare and contrast studies due to variability in the focus, design, style and quality of studies. Decisions with regard to scoring were weighted by the need to understand rigour (in findings relating to street gang affiliation risks for male participants). However, the identification of street gang-affiliation risks was not necessarily the primary aim of these studies. This (as well as priority being given to papers utilising longitudinal cohorts) occasionally led to quality ratings being afforded to included papers, which may not have accurately reflected the overall value of these studies.

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Despite the above limitations, this review has uniquely synthesised risk factors for male street gang affiliation using a systematic approach, and outlined where there is predictive or associated validity for these. It was possible to communicate a clear narrative via these findings.

Clinical Implications

Diagnostic accuracy.

Although conduct disorder (CD) (Lahey, Waldman & McBurnett, 1999; Howell & Egley, 2005; Madden, 2013) and subsequent antisocial personality disorder (Coid et al., 2013; Valdez, Kaplam & Codina, 2000) have been associated with gang-affiliation, evidence from this review elicited curiosity regarding the accuracy of such diagnoses. Firstly, some ‘symptoms’ of conduct disorder, such as running away from home on two occasions or truanting under the age of thirteen, (The Diagnostic and Statistical Manual of Mental Disorders 5th ed. (DSM-V); American Psychiatric Association (APA), 2013) may be explained by factors identified in this review, such as wanting to avoid abuse, lack of supervision and feeling disenfranchised at school. Secondly, early ‘antisocial’ behaviour could instead be symptomatic of developmental trauma histories (van der Kolk, Spinazzola, Blaustein, Hopper, Hopper, Korn & Simpson, 2007). It has been recognised that CD is often over-diagnosed in areas affected by socioeconomic deprivation, and in males (Keenan, Jacobson, Soleymani, Mayes, & Yaldoo, 1996; McCabe, Rodgers, Yeh & Hough, 2004).

Gang-affiliated cohorts are more likely to be male, raised in an area of high socioeconomic deprivation, and to be exposed to both interfamilial and community violence. Evidence demonstrates that males with PTSD present far more frequently with externalising symptoms than do females (Jenkins & Bell, 1994; Gorman-Smith & Tolan, 1998; Fitzpatrick & Boldizar, 1993; Silverthorn & Frick, 1999). It has been proposed that trauma histories are in

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fact so ‘ubiquitous’ in the CD population that CD symptoms could in fact simply be a direct expression of post-traumatic symptomatology (Greenwald, 2002). A developmental trauma or PTSD diagnosis could, therefore, be a more accurate diagnostic pathway for young people at risk of gang-affiliation.

The diagnosis most likely to capture the effects of childhood victimisation and abuse is PTSD (Schauer, Neuner & Elbert, 2011). Furthermore, it is recognised that victimisation perpetuated towards children by carers amplifies trauma outcomes (van der Kolk, 2005). However, a PTSD diagnosis fails to account for generic affect difficulties and relational difficulties seen in this group. DSM-V’s ‘reactive attachment disorder’ doesn’t account for the consequences of violent assault or functional relational impairment. A developmental trauma (van der Kolk, 2005), or PTSD diagnosis could potentially be a more accurate diagnostic pathway for young people at risk of gang-affiliation.

The DSM-V’s failure to recognise developmental trauma (for a full discussion, see Schmid, Petermann & Fegert, 2013) has created an increased risk of misdiagnosis, or of children with attachment difficulties and protracted trauma histories being overlooked (Kaminer, Seedat & Stein, 2005; Alisic, 2011; Meiser-Stedman, Smith, Glucksman, Yule & Dalgleish, 2008; Scheeringa, Zeanah, Myers & Putman, 2003). Untreated developmental trauma and PTSD were highlighted in this review (Coid et al., 2013), supported by longitudinal research (Danyko et al., 2002), and emerged as ‘perhaps the most significant risk factor’ at the first U.K. specialist mental health conference to focus on the mental health needs of gang members (IoP, Gangs Conference, 2015). Although anxiety, low self-esteem, antisocial rumination and psychosis were also identified, Coid (personal communication, 2015) suggested that as his participant group consisted of adults, these presentations quite possibly began via earlier developmental trauma pathways. Evidence from this review would support this position.

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Attachment theory demonstrates that maltreated children often demonstrate affect and behavioural dysregulation, cognitive alterations in attention and schema, and interpersonal relational difficulties (D'Andrea, Stolbach, Spinazzola & van der Kolk, 2012). Witnessing domestic violence in childhood is associated with emotional dysregulation consequential with malfunctioning limbic system development (Teicher, Tomodo & Anderson, 2006), and blunted diurnal cortisol (Murray-Close, Han, Cicchetti, Crick & Rogosch, 2008); which can manifest as hostility and aggression. It was anticipated that attachment theory could offer an improved understanding of the pathway to gang-affiliation and explain some the regulatory difficulties found in this group (Schorre, 2001; Cassidey and Shaver, 1999; Goldberg, 1999, Howe, 1999). As many of the papers were not grounded in psychological theory, there was not enough evidence to link individual attachment styles to gang-affiliation. However, the risks relating to abuse and neglect in childhood would suggest likely attachment difficulties in this cohort.

That identification and treatment of developmental trauma or PTSD can reduce cyclic victimisation and violence commission (Ruchkin, Henrich, Jones, Vermeiren & Schwab-Stone, 2007) should be of significance not only to 'clinicians', but also to policy advisors, voluntary sector organisations, and any organisations or individuals committed to reducing serious group violence. Given the consequences of untreated developmental trauma or PTSD in childhood, a proactive inquiry of exposure to violence in children presenting with CD symptoms is recommended (Bell & Jenkins, 1991; Giaconia, Reinherzm Silverman, Pakiz, Frost & Cohen, 1995), and the use of valid and age-appropriate screening measures (which take in to account both the views and the developmental stage of the child) should be used to improve the accuracy of the diagnosis (Strand, Sarmiento, & Pasquale, 2005).

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Access to support.

Regardless of which diagnosis is most appropriate at the point of presentation, access to psychological support should be made available to this high-need group as early as possible, and evidence-based interventions must be applied. This review highlighted that gang-affiliated individuals actually engage better with treatment than do non-gang affiliated individuals (Coid et al., 2013); however, accessibility of services needs to be considered. If individuals are not attending school or accessing other statutory sector services, they may not be aware of how to access psychological support. Post code territories, the stigma of mental health difficulties, the risk of being perceived as weak, and an inherent lack of trust in authority figures can all create further barriers to seeking help (Department of Health, 2013; MAC-UK, personal communication, 2015).

Working in partnership.

Flanagan and Hancock (2010) have suggested that ‘hard to reach’ groups often engage better with voluntary sector organisations than with the statutory sector. Due to the cumulative risks faced by gang-affiliated individuals, and the holistic nature of these, it is imperative for organisations to work in partnership and to share expertise when designing pathways for psychological support or treatment for this group. Furthermore, it would be advisable for voluntary and statutory sector services to actively encourage individuals who have experienced gang involvement to share their expertise through participation routes so as to create innovative and effective services that are youth-centred and accessible.

Research Implications

As gang violence increases, pressure mounts to identify features underlying this phenomenon in order to assist practitioners striving to identify the most prudent use of limited resources, and to design effective interventions.

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Weaknesses in the quality of papers included in this study restricted the ability to draw conclusions about the direction of risk variables, or to generalise results with confidence.

Furthermore, there was an overarching lack of emerging predictive psychological or psychiatric factors considered to underpin gang-affiliation. This led to difficulties in providing a strong evidence based narrative in this area, or to propose specific mental health interventions, despite the motivation to do so.

Researchers should focus their attention to the individual issues that contribute to gang-affiliation, as highlighted in this systematic review, and analyse the strength of these empirically via case-controlled studies (describing sampling methods, including demographic information, ensuring sufficient power, controlling for confounding factors and reporting on estimates of variance) so that these conclusions can be drawn more conclusively. Ideally, these studies would include control groups with similar demographic characteristics, allowing for sensitive analysis of risks that differentiate between the two groups.

The inconsistent use of measures to identify sample groups as ‘gang-affiliated’ has led to concern that the phenomenon under analysis might not be consistent. The development of a robust gang-affiliation measure is needed in order to increase confidence that researchers are selecting participants with a shared presentation. In the shorter term, researchers should seek to use measurements with some objective validity, and should be transparent about which measures are used and the potential shortcomings thereof.

Cohort studies could offer insights into how identified risks interact, develop and relate to one another over time. The use of longitudinal designs would offer an increased ability to validate predictive risks, reduce the potential impact of recall bias on the validity of findings (Mann, 2003), and offer insight into directionality.

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Once predictive risks are identified and confirmed, well designed RCT's with a focus on the efficacy of specific targeted support could lead to models of gang-affiliation prevention through early intervention. This should include a focus on specific predictive mental health risks and evidence based treatment interventions.

Conclusion

This review would suggest that risk exposure for this group begins through the interaction of genes and the environment in the family. Further risk exposure (across a multitude of domains) creates a 'toxic' web during crucial developmental stages, resulting in extremely vulnerable young people. Studies analysing data from longitudinal samples demonstrated that pre-teen stress exposure, poverty and ethnicity mediated the impact of this cumulative risk exposure.

The emergent meta-narrative was of gang-affiliated males having experienced developmental trauma, and having been drawn to street gangs in order to fulfil their fundamental need to belong, to be protected and to achieve socioeconomic stability. The evidence supporting this meta-narrative validates the importance of early intervention (including safeguarding, family work and targeted mental health support). Further research is required, to accurately identify those at risk of gang-affiliation, and to analyse the efficacy of targeted interventions.

Symbolic demonisation (Goldson, 2011) of gang-affiliated young people, through the media or public discourse, will likely fuel young people's sense of rejection from society. Instead, taking collective responsibility and ensuring that evidence based, timely and holistic interventions are offered would offer a more promising way of decreasing the allure of gangs for those identified as susceptible to becoming affiliated, and reducing gang-related violence within our communities.

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Section B

Design, Development and Validity Testing of the Gang Affiliation Risk Measure (GARM)

Carlotta Raby

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A thesis submitted in partial fulfilment of the requirements of

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Doctor of Clinical Psychology Abstract

Abstract

This study aimed to create the first measure of risk for UK gang-affiliation. A pilot stage invited gang-affiliated and non-gang affiliated participants between the ages of 16–25 to retrospectively self-report on 58 items of risk exposure at the age of 11. Based on performance of these items, a 26-item measure was developed and administered to a main study sample (n = 185) of gang-affiliated and non-gang affiliated participants. Categorical Principal Component Analysis was applied to data, yielding a single-factor solution (historic lack of safety and current perception of threat). A 15-item gang affiliation risk measure (GARM) was subsequently created. The GARM demonstrated good internal consistency, construct validity and discriminative ability. Items from the GARM were then transformed to read prospectively, resulting in a test measure for predictive purposes (T-GARM). However, the T-GARM requires further validation regarding its predictive utility and generalisability.

Keywords: Gang, measure, risk, young people, UK

Introduction

The spread of gangs has been likened to epidemiological core infection, and social contagion models (Laumann & Youm, 1999; Fagan, Wilkinson & Davies, 2007), particularly in areas characterised by low socio-economic status (Gilman, Kawachi, Fitzmaurice & Buka, 2003; Pyrooz, 2014; Raby & Jones, submitted). Whilst youth gangs are not a new phenomenon (Johnson & Muhlhausen, 2005), the relatively recent transnational extension of gang activity has resulted in a global security threat (Johnson & Muhlhausen, 2005) to include U.K. cities (Decker, 2007).

Whilst there is no universal definition of ‘gang’ (see Esbensen, Winfree, He, & Taylor, 2001), this study has adopted the Eurogang definition (Weerman et al., 2009, p. 20):

‘(A gang is) any durable, street-oriented youth group whose involvement in illegal activity is part of its group identity.’

Esbenson and Huizinga (1993), Thornberry, Hawkins and Krohn (1998) and Hill, Howell, Hawkins and Battin-Pearson (1999) suggested that individuals drawn to gang-affiliation are a vulnerable group, affected by compound risk exposure. A hypothetical developmental model for gang-affiliation was proposed by Howell and Egley (2005), indicating that risks presented across five domains (individual, family, peers, school and community), and that the cumulative nature of these risks presented a sixth separate risk. Hill et al. (1999) asserted that individuals exposed to seven or more risk factors were 13 times more likely to become gang-affiliated than individuals exposed to one, or no risk factors. These risks began at pre-school age and built throughout childhood (to a point of gang-affiliation in mid-adolescence) (Howell & Egley, 2005). Coid et al. (2013) found that gang-affiliation represented a major

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UK public mental health concern, and that violent victimisation was directly related to psychiatric consultation, admission and morbidity.

A recent systematic review (including 102 studies) (Raby & Jones, submitted) identified predictive risks (from studies utilising longitudinal designs) and associated risks (for studies using observational methods) for gang-affiliation (see Table 1). The overarching meta-narrative emerging from this review was of a failure to safeguard vulnerable individuals, and support was offered for a relationship between developmental trauma and gang affiliation (Danyko et al., 2002; Institute of Psychiatry, Forensic and Neurodevelopmental Gangs Conference, 2015; Coid, personal communication, 2015).

It seemed logical that a screening measure for risk of gang-affiliation would enable vulnerable individuals to be identified, and offered targeted early intervention (thus reducing further psychological injury). However, a lack of validated screening measures made this impossible. Table 2 summarises available measures, their designed functions, and why they are inadequate for this purpose.

In summary, these measures do not focus on gang-affiliation risks per se. Furthermore, they have a country-specific bias, or rely on retrospective post-gang membership self-report.

Risks which emerged from the systematic review (Raby & Jones, submitted) could have been utilised as a foundation for such a screening measure. However, the generalisability of identified risks to a UK context was questionable, with only eight studies conducted in the UK (76 were undertaken in the US).

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Table 1

Evidenced Risks for Gang-Affiliation (Raby & Jones, submitted)

Categories	Predictive Evidence	Associated Evidence
Family	Genetic Low parental education Poverty Low parental supervision Familial gang involvement	Difficult family dynamics Abuse (sexual, physical, emotional, neglect) Running away from home
Individual	Male 13–15 years BAEM Difficulties in perspective taking Economic disadvantage Antisocial behaviour Lack of responsibility Low self-esteem Weak pro-social bonds	Hyperactivity Inattention Low morality Angry ruminations Poor interpersonal skills High psychological distress (PTSD/anxiety/depression)
Peers	Anti-social peers	Peer gang involvement
School	School failure Low academic performance	Perception of low academic performance Low commitment to school Bad relationships with teachers School suspension
Community	Urban Antisocial community Community deprivation Community instability	High gang presence Feels threatened in community
Cumulative	Cumulative stress mediated by race, financial difficulties and pre-teen stress exposure	Cumulative stress independently increases individual risk (particularly when over 7 combined risks are present)

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Table 2

Summary of Available Gang Measures

Name of measure	Author	What is it designed to do?	Why is this not enough?
OJJDP Comprehensive Gang Model	Howell (2003) & U.S. Office of Juvenile Justice and Delinquency Prevention (OJJDP)	Consists of six levels of program interventions and sanctions.	Framework summarises risk factors, but is only focussed on preventative or intervention programmes in the US (Howell, 1995), violent offending (Loeber & Farrington, 1998a; 1998b), generic child delinquency (Loeber & Farrington, 2001a) or longitudinal prospective studies of generic youth delinquency (Pittsburgh Youth Study, directed by Dr. Rolf Loeber; the Denver Youth Survey, directed by Dr. David Huizinga; the Rochester Youth Development Study, directed by Dr. Terence P. Thornberry; as summarised by Howell, 2003).
Gang Risk Assessment Instrument (GRAI)	Chettleburgh (2011)	Designed to assist practitioners in intelligence gathering.	Designed to assist practitioners in intelligence gathering. Furthermore, it is specific to the context of Canada.
Self-reporting on gang membership	Thornberry & Krohn (2000) Esbensen, Winfree, He & Taylor (2001)	Self-reporting on gang membership	Depends on the individual already being a member of a gang, and doesn't allow for ascertaining whether someone is at risk of becoming a gang member.

It became evident that an improved understanding of U.K. risks associated with gang affiliation would be required, prior to creating a U.K. screening measure. Many studies included in the systematic review (Raby & Jones, submitted) identified risks that were intrinsic to areas affected by low socio-economic status, making it difficult to identify whether these risks determined gang-affiliation, or whether they were confounding factors. Therefore, it seemed pertinent to explore risk factors in individuals from the same postcode

area(s), to ascertain which of these differentiated between gang-affiliated and non-gang affiliated individuals.

Aims

This study aimed to create a gang affiliation risk measure (GARM), sensitive to a UK context, by analysing the differences in historic risk exposure between gang-affiliated and non-gang affiliated samples. As males were significantly over-represented in the gang-affiliated population (Decker, Melde & Pyrooz, 2013; Pyrooz & Sweeten, 2015; Farmer & Hairston, 2013), and the UK Office of the Children's Commissioner (2015) had undertaken extensive research on female gang-affiliation, this study focused on a male population only.

As the systemic report (Raby & Jones, submitted) and intelligence sources (Home Office, 2013; IGU, 2013) supported previous research findings (Pyrooz, 2014) indicating a vulnerability to gang-affiliation upon transition to secondary school, this study focussed on retrospective reporting on risk exposure patterns at the age of 11.

This meta-aim involved several sub-aims:

1. Creating a pilot gang-affiliation risk measure (GARM)
2. Investigating the in-depth structure of the latent traits
3. Identifying the construct validity of these factors
4. Examining the reliability, internal consistency and factor structure of a final measure
5. Testing the measure's discriminatory ability (as demonstrated by adequate sensitivity and specificity in detecting gang-affiliation)

Method

Design

This study was undertaken in two stages. The first stage pertained to measure development and the creation of a pilot GARM (P-GARM) (see Appendix 1). This included consultation with a range of experts to gain an improved understanding of whether risks identified in the systematic review (Raby & Jones, submitted) aligned with their operational or lived experience of gang affiliation in the UK. Thereafter, this stage involved a process of item design and selection for the P-GARM.

The second stage of the study focussed on measure testing. This initially involved testing the 58-item P-GARM on a pilot group, to examine item performance and assist decisions regarding item inclusion for the main 26-item test measure (GARM) (see Appendix 2).

Thereafter, the GARM was tested with the main sample in order to analyse its factor structure, construct validity, internal consistency and discriminative ability. The results of this analysis informed item inclusion for the final 15-item GARM measure (see Appendix 3) and the predictive test measure (T-GARM) (see Appendix 4).

Participants

Study inclusion criteria, and sample demographics for both the pilot study and the main study will be described in this section. The allocation of participants into the sample or control group will be described in the measures section, and the recruitment of participants will be covered in the procedures section.

Thirty-four participants (sample group $n=14$; control group $n=20$) were involved in the pilot stage. Participants were male, aged between 16 and 25 years at the time of the study, and had been born and raised in the Borough of interest. No further demographic information was gathered for the pilot study. This decision was based on the experts by experience

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(membership information will be explained in the data collection section) warning the primary researcher about hypervigilance amongst local gang-affiliated individuals (regarding undercover intelligence officers). It was suggested that refraining from collecting demographic information in the early stages would increase trust in the authenticity of research assistants collecting data for the purposes of the study only, and potentially assist with snowballing samples thereafter. The pilot study participants were given vouchers (of £10.00) to recognise their time and input in shaping the early stages of the measure.

For the main study an additional 151 participants were recruited using the equivalent criteria (control group $n=68$; sample group $n=83$). Kline (1994) suggests that a sample size of 100 is adequate for factor analysis, in order to validate a measure. Further demographic information was collected including age, ethnicity, gender and sexuality (by this stage community trust had increased, and the main researcher wanted to ensure that sample groups were comparable in profile) (see Appendix 5 and Table 3).

The pilot study was treated as an internal pilot, and the data from this was added to the main sample data, resulting in a final sample size of $n=185$. This was considered appropriate by the local group, researchers and statistician (as participants came from the same postcode area, were of a matched age and gender, had been through a consistent process of recruitment and procedure, and would increase the overall data). Further consideration of this can be seen in the analysis and limitation sections.

Non-gang affiliated and gang-affiliated participants had similar characteristics, regarding ethnicity, with most participants self-identifying as Caribbean. All participants self-reported their sexuality as 'straight'. The mean age for both groups was approximately 19 years, differing only by 5.2 months.

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Table 3

Demographic Information for the Main Study Sample

Demographic Information	Sample group (n = 87)	Control group (n = 64)
Missing data	3	2
Mean age	19.78	19.16
Mode age	18	18
SD (age)	3.18	2.65
Ethnicity		
Asian other	1	1
Kurdish	1	0
White other	4	0
Turkish	1	1
Pakistani	0	3
Indian	2	1
Black British	5	1
Other mixed	3	1
Black other	4	2
White British	10	12
Bangladeshi	7	2
Caribbean	23	17
African	20	10
White & Black African	3	11
Sexuality		
Straight	84	62

The mean, mode and median scores were calculated based on dates of birth at the end of the study.

Measures

Measures of gang-affiliation.

Whilst the heterogeneity of gang structures currently makes gang membership challenging to measure (Coid et al., 2013), Esbensen et al. (2001) and Klein (1995) offer evidence of self-reporting being a sufficient methodology. Tapia's (2011) approach demonstrates how intelligence records can be additionally utilised; overcoming potential criticisms of self-report bias. Participants were, therefore, allocated to the sample group or control group, through intelligence (London-wide and local intelligence sources) and self-report measures.

The Metropolitan Police Service has a database of individuals they consider to be gang-affiliated (the 'gang matrix'). The Local Authority Gangs Unit have created a local version. From these intelligence sources, names of gang-affiliated males (who met the inclusion criteria) were extracted. This process was approved by ethical standards boards, and is further considered in the ethics section.

At the Local Authority Gangs Unit meetings, third-sector organisations shared intelligence about gang-affiliated individuals with the primary researcher. Participants were further invited to self-report. A summary of how intelligence sources and self-reporting led to the identification of participants as gang-affiliated or non-gang affiliated can be seen in Table 4.

Occasionally, participants would be identified by others as non-gang affiliated, but would self-report as gang-affiliated. Following intelligence checks, participants were re-coded to reflect their gang-affiliation. Interestingly, self-report correlated with intelligence records.

However, some disagreement about gang-affiliation occurred between community workers and intelligence sources. In these cases, intelligence sources were prioritised, as they were judged to be a more objective source of information by the main researcher. This stated, the

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matrix is a dynamic entity, with individuals remaining on the list for approximately two years (meaning that they are not guaranteed to feature at any one point in time). For this reason, when participants featured on the matrix and additionally self-reported to be gang-affiliated, they were categorised as a matrix gang-affiliated sample and seen as the ‘purest’ sample for this study. In summary, there were three categories to which participants were allocated (non-gang affiliated, gang-affiliated and matrix gang-affiliated).

Pilot study measure.

The 58-item Pilot Gang Affiliation Risk Measure (P-GARM) was used in the pilot study (see Appendix 1). Time was incorporated for ‘think alouds’, which are a recommended technique in measure development, enabling participants to clarify or discuss items (Wilson, 2004). Exit interviews are also recommended, offering participants the opportunity for reflection, post completion of the measure (Wilson, 2004). Exit interviews focussed on missing items (by asking: “Is there anything you think we haven’t asked you about, which you would say was an important risk for gang-affiliation?”), and reflections (both on the measure, and their involvement in the study).

Main study measure.

The 26-item Gang Affiliation Risk Measure (GARM) consisted of the 26 items retained from the 58-item pilot version used in the main study (see Appendix 2). Time was similarly incorporated for ‘think alouds’ and ‘exit interviews.’

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Table 4

How Sources Identified Participants as Non-Gang Affiliated or Gang-Affiliated Group

Intelligence source	How ‘gang’ membership was identified	How non ‘gang’ membership was identified
Local Authority Expert Gangs Unit	Based on individual acts of violence, criminal offending and current (last 12 months) gang involvement, association with local people known to be gang affiliated, intelligence and partner agency information.	Based on lack of individual acts of violence, criminal offending and current (last 12 months) gang involvement, association with local people known to be gang affiliated, intelligence and partner agency information.
Local intelligence (community workers)	Community workers classed people with whom they worked as members of gangs if they had heard them speak openly about being gang involved, knew they were associated with or a member of a named local gang, knew they had been charged with a gang-related offence, or had been informed by other gang-affiliated young people of their gang membership.	Community workers deemed a young person to not be gang affiliated if they had not mentioned their affiliation or membership to a local gang, hadn’t been known by others to be involved and had never (to their knowledge) been charged with a gang-related offence.
Trident Gang Intelligence Matrix	Based on individual acts of violence, criminal offending and current (last 12 months) gang involvement, intelligence and partner agency information.	Based on lack of individual acts of violence, criminal offending and current (last 12 months) gang involvement, intelligence and partner agency information.
Prison intelligence	Discussions in prison about gang affiliation, acts of gang related violence, or changes of allegiance while in prison.	Discussions in prison or action demonstrating desistance from gangs.
Self-report measure	<p>Ticking the following statements during interview:</p> <p>I have been a member of a gang in the past, or</p> <p>I have hung around with other people who are gang affiliated and been involved in some small-scale activities, but wouldn’t identify as being ‘in a gang’ in the past</p>	<p>Ticking the following statements during interview:</p> <p>I have hung around with other people who are gang affiliated and been involved in some small-scale activities, but wouldn’t identify as being ‘in a gang’ in the past (and, upon discussion with researcher,</p>

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(however, upon discussion with researcher, disclosed participation in illegal activities while associating with known gang members).

this was low-level antisocial behaviour with a group of friends who were not known gang associates), or

I have never been affiliated with anyone in a gang, and I have never been involved in a gang myself in the past.

Procedure

Recruitment and consent.

Participants were recruited from a single London Borough, with low socio-economic status and high levels of gang-related violence. Participants were recruited from schools, community settings and prisons. In order to reduce response bias, no participants were known to the researcher.

For community interviews, the primary researcher undertook outreach to schools and community groups to inform people about the study (see Appendix 6), and assist in recruiting self-reporting participants. This led to snowball sampling (Saunders, Lewis & Thornhill, 2003), through community workers and young people. Interested individuals received an information sheet (see Appendix 7). Thereafter, the primary researcher revisited the same settings for potential participants to enquire further about the study, before they signed consent to be involved (see Appendix 8).

Incarcerated individuals were written to and invited to participate in the research, with information pertaining to the study. Prison officers talked through the decision with them, and created a list of interested participants. When research assistants met with them, they read through the information sheet once more, and potential participants had the opportunity to ask questions, before signing the consent sheet.

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Data collection.

Measure development.

To consult with national experts, the primary researcher attended an existing Home Office Ending Gang and Youth Violence (EGYV) national expert meeting (for membership criteria, see Appendix 5). Local experts and previously gang-affiliated young people (experts by experience) were consulted through a Local Authority Gangs Unit meeting (for membership criteria, see Appendix 6).

A presentation was delivered to all expert groups regarding the research, and members were invited to submit factors (electronically) that they and their frontline teams deemed to be associated with gang-affiliation. National and local intelligence officers further submitted six anonymised and pre-existing ‘tracking maps’ of gang-affiliated individuals from birth to point of arrest, to assist in identifying individual risk factors (see Appendix 7).

The main author identified areas of risk included in the measure based on (i) a systematic review of the literature (Raby & Jones, submitted), (ii) consultation with experts, and (iii) the ability for risk areas to be translated into self-report items. Included risk areas were translated into question items, in partnership with the local expert group.

Stratification of items were theoretically based on Howell and Egley’s (2005) model and categorised into family, individual, peer and community sections. The Diagnostic and Statistical Manual of Mental Disorders (5th ed. DSM–5; American Psychiatric Association, 2013), Screening Interview for Adolescents (SIfA) (Kroll, Bailey, Myatt, McCarthy, Shuttleworth, Rothwell & Harrington, nd) and The Mental Health Screening Questionnaire Interview for Adolescents (SQIfA) (Youth Justice Board, 2003) were considered when mental health items were created for the measure (see Appendix 8 for three examples).

Once a core group of questions were selected, all members decided that the experts by

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experience group should have the final say regarding wording, as they wanted the questionnaire to incorporate language young people would use.

The local expert group met four times, and individual members communicated back and forth (electronically) between meetings to produce the pilot measure (P-GARM). Following the pilot stage, the local expert group met once more, to decide on main study items.

Pilot and main study.

Research assistants were recruited to assist the main researcher in interviewing participants.

Two clinically trained research assistants with experience of working with gang-affiliated adolescents in the local area were recruited. Prior to meeting with participants, they role-played use of the measure, and prompts were incorporated to increase consistency. Research assistants were encouraged to make observations and take notes throughout interviews, regarding respondents' engagement. Where two research assistants were present, they rotated the role of lead interviewer for each participant. Subsequent debriefing meetings enhanced the cohesion of interview style.

The Prison Reform Trust (2010) suggested that at least 23% of young offenders had an IQ of less than 70. This led to the decision to read out the measure for participants. It was further considered that this could improve the research assistant's ability to identify any misinterpretation of items.

Due to the sensitivity of information, participants were met with individually and in settings that provided them with sufficient privacy. In community-based interviews, research assistants met with participants at a distance from other young people to ensure that responses were not overheard. Some interviews were conducted on a 1:1 basis, and wherever possible, a second research assistant was present.

In prison interviews, participants were interviewed with two research assistants present for

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safety reasons (one research assistant interviewed, the other took notes). In two cases, prison officers were also present (due to risk issues), but not within easy earshot.

The 58-item P-GARM took approximately 30 minutes to complete, and the 26-item GARM took approximately 20 minutes to complete.

Ethics

Approval for the study was obtained from the Salomons University board of ethical standards (see Appendix 9), the Local Authority board of ethical standards (see Appendix 10a) and the National Offender Management Service (NOMS) board of ethical standards (see Appendix 10b). Letters were written to schools, and prison governors with a supporting letter from the Gangs Unit (see Appendix 11a-c). The main researcher subsequently presented the research proposal to prison governors (where identified participants were accommodated).

Despite clearance to use intelligence sources to strengthen the validity of the sample group, time was spent reflecting on the most ethical way to utilise such information (whilst also managing associated risks). Although individuals would have been informed of being on the matrix (by the police), and prison officers had access to this information, visits to incarcerated participants only took place once a non-gang affiliated sample group had been identified in the same establishment. It was, therefore, perceived that we were interviewing all individuals from the Borough of interest about how to reduce gang affiliation, as opposed to their participation being suggestive of gang-affiliation. When alone with individuals we had transparent conversations about their gang affiliation for the purposes of group allocation.

Informed consent was obtained from all participants. Particular consideration, time and attention was given to ensuring that incarcerated participants understood the nature of the research, and genuinely wanted to participate, after which they were given a consent sheet to

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sign (see Appendix 12).

During prison visits, prison officers were allocated to research assistants. Unless participants were deemed to pose a direct risk to the research assistant, prison officers waited outside interview rooms, which research assistants set up to ensure access to alarms and exits. Local Authority lone working policies were adhered to during community outreach visits. For participants between the ages of 16 and 18 in the care of the Local Authority, consent was sought from agencies in loco parentis. Where participants were unable to sign consent due to physical disabilities, a second researcher signed that they had witnessed verbal consent. Participants were allocated codes, and responses were entered into an anonymized data sheet, to protect identity.

Due to the nature of the questions, distress was deemed possible. Upon advice of the experts by experience, fixed 'yes' or 'no' responses were selected (instead of polytomous or graded responses) and a 'prefer not to say' option was added, to reduce the risk of emotional dysregulation. It was also explained to them that they could withdraw their consent to participate at any time, without repercussions. Research assistants were clinically trained, and asked to observe for signs of distress, overtly inquire as to whether distress had been caused (post-interview), and offer helpline numbers if needed (see Appendix 13). Named staff were identified as points of referral, regarding safeguarding or health referrals. Research assistants recorded no signs of distress, and no participants self-reported that the study had caused them any discomfort. Conversely, feedback from participants indicated that they felt positive about utilising their experiences of gang affiliation for a valuable purpose. It should be noted that of the 187 participants approached, 186 participants consented to participate, expressing their motivation as a desire to see younger people in their areas have a better future. One participant was excluded due to the acuteness of his mental health needs, resulting in a health referral, and three used exit interviews to help-seeking regarding historic symptoms. The

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research team liaised with prison governors to arrange this.

Results of this study have been summarised and sent to NOMS and Salomons University (see Appendix 14). The full study has been sent to the Director of Children's Services in the relevant Borough, the Local Authority Gangs Unit and the Home Office.

Analysis

Measure development.

To meet the first aim of this study (produce a gang-affiliation risk measure) items considered to have performed well in the pilot study were included in the main study and items performing badly were eliminated (to be detailed in the results section).

Measure testing.

To achieve the second and third aims of this study (investigate the in-depth structure of the latent traits and identify the construct validity of these factors), categorical principal components analysis (CatPCA) was employed, which aided decisions regarding item selection. Furthermore, decisions were informed by a chi-square analysis and the views of the experts group. The third aim of this study (calculate the internal consistency of the identified factor) was met through use of Cronbach's α (Cronbach, 1951).

The fourth aim of this study was to test the measure's discriminatory ability. Preliminary analysis of descriptive statistics (see Appendix 15) established that the non-parametric Mann-Whitney U test (Mann & Whitney, 1947), and Kruskal-Wallis test (Kruskal & Wallis, 1952), should be used to determine whether the total score significantly differed between groups. Bonferroni tests (Bonferroni, 1936) were employed to ensure robustness of statistical significance and GARM's discriminative validity was tested using receiver operating characteristic (ROC) analysis.

Data were anonymized and entered into an IBS SPSS database (SPSS, 1994), which was

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reviewed by the main author for input errors and accuracy. A statistician further verified all analyses.

Results

Measure Development

In the consultation stage, there was consistent agreement on risk areas, within and between the local group, national group and experts by experience group. The local expert group helped the primary researcher to transform risk areas into question items (see Appendix 16).

Fifty-eight items were developed and formed the P-GARM (see Appendix 1 for version given to participants). All questions included in the P-GARM can be seen in Table 5. Following Wilson (2004), this initial version of the measure had a relatively large number of items, to enable a subsequent smaller selection of best performing items from this wider set.

Table 5

P-GARM Risk Areas and Question Items

Risk area	Recommended by	Question item
Witnessing domestic violence	All parties	Had you witnessed violence at home?
Social modelling of problem solving using violence	All parties	Did the people who lived with you sort out problems using violence?
Parental supervision	All parties	Did you usually tell your family where you were going, when you went out?
Parental supervision	All parties	When you got home from school, did anyone ask you how your day had been?
Absence of biological father	All parties	Was your biological father living at home with you?

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Familial gang membership	All parties (except experts by experience)	Did you have a family member in a gang?
Abuse	All parties	Do you think that kids should be treated how you were treated at home?
Physical abuse	All parties	Had you experienced harsh discipline at home?
Unemployed parents	All parties	Did your parents work?
Lack of protection	All parties	Did you feel protected from harmful or dangerous adults?
Sexual abuse	All parties	Had you experienced sexual abuse?
Mum under the age of 20 at birth	All parties (except EBE)	Was your mum under the age of 20 when she had you?
Known to social care	IGU	Did you have a social worker?
School exclusion/suspension	All parties	Did you get kicked out of school at any point?
Teachers not caring about attainment	Systematic review	Did your teachers care if you did well at school?
Parents not caring about attainment	Systematic review	Did your parents care if you did well at school?
Perception of education linked to employment	EBE	Did you think that if you worked hard at school you'd get a good job?
Bunking off school	EBE	Did you regularly bunk off school?

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Bad relationship with teachers	Systematic review	Did you like most of your teachers?
Awareness of postcode gangs	All parties	Were you aware of postcode gangs in your area?
Witnessing community violence	All parties	Had you witnessed violence in your area?
Join for financial gain (traditional means not perceived as available)	All parties	Did you think it was easier to make money on the roads than getting a job?
Feeling of fear in community	All parties	Did you often have a feeling of fear when leaving your front door?
Perception of poverty in comparison to peers	All parties	Did your friends seem to have more money than you?
Avoidance (PTSD) in community	All parties	Were there areas you'd avoid, you'd witnessed, experienced or heard about violence?
Lack of safe spaces in community	All parties	Were there areas you could go to that felt calm, and not too hot for you?
Anti-social peer group	All parties	Were most of your friends on the roads?
Gang-affiliated peer group	All parties	Were most of your friends in a gang?
Knowledge of people in gangs	All parties	Did you know many people in gangs?
Hearing of traumatic violence in community	All parties	Had you regularly heard about people being shot, stabbed or killed in your area?

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Availability of drugs	All parties	Were drugs available in your area?
Knowledge of drug dealing	All parties	Did you know of shotting going on in your area?
Smoked weed	All parties (except EBE- normal development?)	Had you smoked weed?
Been victim of violence	All parties	Had you been badly beaten up?
Been perpetrator of violence	All parties (EBE report only post-victimisation)	Had you been in trouble for fighting or hurting other people?
Use of alcohol	All parties (except EBE- normal development?)	Had you got drunk?
Experienced bullying	All parties	Had you been bullied?
Lack of pro-social peers (CD)	All parties	Did you find it easy to make friends with people who behaved well at school?
Frequent aggressive thoughts (CD)	All parties	Did you often have aggressive thoughts?
Regular nightmares (PTSD)	All parties	Did you regularly have nightmares?
Sense of foreshortened future (PTSD)	All parties	Did you have the sense that life would be short?
Hypervigilance (PTSD)	All parties	Was your area so hot for you that you had to look over your shoulder all the time, to stay safe?
Intrusive thoughts/	All parties	Did unpleasant thoughts or images come into your mind unexpectedly, related to violent things

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images (PTSD)		you'd seen or heard?
Sense of foreshortened future (PTSD)	All parties	Could you imagine yourself growing old?
Low self- esteem	All parties (EBE unsure)	Did you feel good about yourself?
Low self- esteem/social status	All parties	Did you feel people respected you?
Externalising (CD)	All parties	When things went wrong in life, would you blame others?
Anxiety	All parties	Did you worry a lot about things before you did them?
Anxiety	All parties	Did you ever experience a racing heart, shaking, shortness of breath and the sense that something bad might happen?
Depression	All parties	Did you experience thoughts that you'd be better off dead?
Conduct Disorder (CD)	All parties	Did you get angry easily?
CD	All parties	When you got angry, did it take you a long time to calm down?
ADHD/Lack of attention	All parties	Did you find it hard to concentrate?
Impulsivity/ ADHD	All parties	Did you often do or say things in the moment, which you later regretted?
Psychosis	Local CAMHS/ community panel members IGU	Had you ever heard voices that didn't seem to belong to anyone around you?
Psychosis	Local CAMHS/ community panel members IGU	Had it seemed like your thoughts or behaviour was controlled by something other than you?
Self-harm	All parties	Sometimes people hurt themselves when they

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		feel stressed. Is this something you had done?
Need/access to counselling	All parties	Had you been able to talk to someone about your feelings, like a counsellor or psychologist?

Pilot study feedback.

Research assistants' notes from exit interviews suggested that the content was well matched to participants' understanding of risks associated with gang-affiliation. One hundred and thirty two participants overtly remarked at the accuracy of risk items, and no participants felt we had missed any items regarding risk.

Research assistant observations, notes from participant 'think-alouds' and exit interviews suggested that respondents had a shared understanding of the meaning of 26 items, but highlighted difficulties with 32 items. All items highlighted for removal (with feedback) can be found in Table 6. Following discussion at a research assistants debrief and local expert meeting, all of these items were eliminated.

Table 6

Items Eliminated Following Pilot Performance Feedback

Question Item	Pilot feedback
Do you think that kids should be treated how you were treated at home?	The question was too vague and not time specific or related to any individual family member. It caused confusion.
Had you experienced harsh discipline at home?	'Harsh discipline' was undefined and not time specific or related to any individual family member. It caused confusion.
Did your parents work?	'Work' and what constituted 'work' caused potential difficulties (whether to include illegal ways of earning money or not). It also risked

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	causing individuals to feel uncomfortable.
Did you feel protected from harmful or dangerous adults?	The lack of definition of ‘harmful or dangerous’ adults seemed to cause confusion when respondents were attempting to answer this question and subsequent discussion risked causing emotional distress. As other items inquired about maltreatment, it was suggested that this item be removed.
Had you experienced sexual abuse?	All respondents said ‘no’ and the EBE suggested that respondents were not likely to feel able to be honest on this item, with the additional risk of shame.
Did you have a social worker?	This raised suspicion and seemed (observation) to make people feel uncomfortable and risked them being guarded in responding to other questions.
Did your teachers care if you did well at school?	Respondents had a variety of teachers before the age of 12, and therefore, it was difficult to answer in a binary way across a variety of teachers and over a non-specific stretch of time. This item was, therefore, suggested for removal.
Did your parents care if you did well at school?	All respondents reported that their parents did care, but observations from research assistants suggested this might be driven by feelings of guilt in saying otherwise as opposed to honest feedback, so this item was suggested to be removed.
Did you think that if you worked hard at school you’d get a good job?	Exit interviews suggested that the lack of specific criteria for ‘good job’ made it difficult to answer this question. For example, ‘good’ could pertain to getting a lot of money, and therefore could relate to illegal work. This item was recommended for removal.
Did you regularly bunk off school?	There were many reasons that respondents did not attend school, and ‘think alouds’ suggested that this question led to discussions about the reasons many of them didn’t go to school and had called it bunking (needing to care for a drug-using parent/not having uniform/being scared to attend). Responses to this item would potentially have been contaminated by other factors, and therefore was recommended for removal.
Did you like most of your teachers?	The question was too vague and not time specific or related to any particular school or year group. It

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	caused confusion, especially for individuals who had attended many different schools.
Were most of your friends on the roads?	The concern about ‘snitching’ and suspicion raised from this question led research assistants to discuss the item with EBE. Between them, it was suggested that this item be dropped.
Were most of your friends in a gang?	The concern about ‘snitching’ and suspicion raised from this question led research assistants to discuss the item with EBE. Between them, it was suggested that this item be dropped.
Did you know many people in gangs?	The concern about ‘snitching’ and suspicion raised from this question led research assistants to discuss the item with EBE. Between them, it was suggested that this item be dropped.
Were drugs available in your area?	The concern about ‘snitching’ and suspicion raised from this question led research assistants to discuss the item with EBE. Between them, it was suggested that this item be dropped.
Did you know of shotting going on in your area?	The concern about ‘snitching’ and suspicion raised from this question led research assistants to discuss the item with EBE. Between them, it was suggested that this item be dropped.
Had you smoked weed?	Everyone suggested that they had never smoked weed. Experts thought this was unlikely to be the case; developmentally, research assistants observed that this seemed untrue; and EBE suggested this wasn’t honest. This item was recommended for removal.
Had you got drunk?	Everyone suggested that they had never been drunk. Experts thought this was unlikely to be the case; developmentally, research assistants observed that this seemed untrue; and EBE suggested this wasn’t honest. This item was recommended for removal.
Had you been bullied?	Everyone suggested that they had never been bullied. Experts thought this was unlikely to be the case; developmentally, research assistants observed that this seemed untrue; and EBE suggested this wasn’t honest. This item was recommended for removal.
Did you find it easy to make friends	This item resulted in research assistants observing

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with people who behaved well at school?	an affective response from responders when they answered that they had been rejected from a pro-social peer group. For ethical reasons, research assistants recommended this item be dropped.
Could you imagine yourself growing old?	In ‘think-alouds’, it seemed that answers to this question were developmentally informed (‘at that age, I couldn’t imagine what old was’) as opposed to measuring the item of interest (PTSD), so it was suggested that this item be dropped.
Did you feel good about yourself?	Exit interviews suggested that this item was too vague (when/what year at school/what does ‘feel good mean’), and therefore it was suggested that this item should be removed.
Did you feel people respected you?	Exit interviews suggested that this item was too vague (when/what year at school/how would ‘respect’ be demonstrated?), and therefore it was suggested that this item should be removed.
When things went wrong in life, would you blame others?	Observations by research assistants and comments suggested that self-report on this item was unlikely to be accurate/possible.
Did you worry a lot about things before you did them?	‘Think alouds’ suggested that ‘things’ was too vague and the question was ambiguous; therefore, it was suggested that this item should be removed.
Did you experience thoughts that you’d be better off dead?	Everyone suggested that they never had. The experts by experience suggested this wasn’t honest. This item was recommended for removal.
Did you get angry easily?	The item was fairly vague and it wasn’t clear what ‘easily’ meant in exit interviews. Observations by research assistants and comments suggested that self-report on this item was unlikely to be accurate/possible.
Did you find it hard to concentrate?	The question was too vague and not time specific or related to any particular school or year group. Observations by research assistants and comments suggested that self-report on this item was unlikely to be accurate/possible.
Did you often do or say things in the moment, which you later regretted?	The question was too vague and not time specific or related to any particular school or year group. Observations by research assistants and comments suggested that self-report on this item was unlikely to be accurate/possible.

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Had you ever heard voices that didn't seem to belong to anyone around you?	The question was too vague. Observations by research assistants and comments suggested that people confused this with just having people around, being in busy places and hearing difficulties. It wasn't targeting feedback on psychosis symptomology.
Sometimes people hurt themselves when they feel stressed. Is this something you had done?	All respondents reported that they had never self-harmed. This was felt unlikely to be honest feedback from research assistants and EBE, so this item was suggested to be removed.
Had you been able to talk to someone about your feelings, like a counsellor or psychologist?	Everyone suggested that they never had. Experts thought this was unlikely to be the case, research assistants observed that this, at times, seemed untrue, and EBE suggested this wasn't honest. This item was recommended for removal.

Whilst two of the research assistants experienced participants as more receptive when employing wording selected by the experts by experience, one research assistant found the opposite. Participants expressed to two of the research assistants that they were more inclined to participate honestly because they could see that other young people had shaped the wording. Conversely, one research assistant received feedback that it felt 'fake', and they felt uncomfortable using 'slang' wording. Considering that the measure would be used by a range of frontline staff, items using 'slang' were re-worded so that the experts by experience considered them accessible, and all research assistants felt comfortable using them. The added value of this was longevity of the measure, beyond particular use of 'slang' terminology. Therefore, three questions were re-worded (see Table 7).

This resulted in a 26-item measure, with three questions re-worded. The GARM measure for the main study can be found in Appendix 2.

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Measure Testing

Recall that the pilot group was treated as an internal pilot group, with data relating to final response items being added to the main study data. Relevant analyses were re-run with pilot group data removed, to ensure that potential minor differences of materials did not affect the observed result. There was no difference in the analysis when they were repeated for the two subsamples, supporting inclusion of the pilot data to the main analysis (see Appendix 17 for these results).

Table 7

Items Selected for Amendment to Wording and New Item Questions

Item	Pilot question	Newly-worded questions, post analysis
Join gang for financial gain	Did you think it was easier to make money on the roads than getting a job?	Did you think it was easier to make money through gang involvement rather than getting a job?
Lack of safe spaces in community	Were there areas you could go to that felt calm, and not too hot for you?	Were there areas you could go to that felt calm, and safe?
Hypervigilance (PTSD)	Was your area so hot for you that you had to look over your shoulder all the time, to stay safe?	In your area, did you feel that you had to look over your shoulder all the time, to stay safe?

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Table 8

Chi-square Test Results for Individual Items Between Groups

Item number	Variable	χ^2 (2)	P
1	Witnessing domestic violence	12.00***	.00
2	Social modelling of problem solving using violence	10.16**	.01
3	Lack of parental supervision A	39.94***	.00
4	Lack of parental supervision B	12.65***	.00
5	Absence of biological father	15.57***	.00
6	Familial gang membership	5.65	.59
7	Mother under 20	1.71	.43
8	Suspension or exclusion from school	37.87***	.00
9	Awareness of postcode gangs	7.59*	.02
10	Witnessing community violence	16.62***	.00
11	Perception that it's easier to make money through gang involvement than other routes	41.57***	.00
12	Fear in community setting	1.22	.55
13	Perception of comparative poverty (to peers)	5.20	.07
14	Avoidance in community	.07	.97
15	Lack of safe space in community	1.62	.45
16	Hearing about community violence	10.34***	.00
17	Victim of violent assault	17.87***	.00
18	Perpetrator of violent assault	28.96***	.00
19	Frequent aggressive thoughts	11.57***	.00
20	Regular nightmares	1.75	.42
21	Sense of foreshortened future	16.61***	.00
22	Hypervigilance	14.12***	.00
23	Intrusive thoughts and images of violent material	2.62	.27
24	Anxiety	2.18	.34
25	Lack of ability to self-regulate	3.66	.16
26	Thoughts and behaviour controlled by something other than themselves	5.93	.52

* $p < .05$, ** $p \leq .01$, *** $p = <.005$

Although it was acknowledged that statistical multiple comparisons can inflate the chances of a Type I error (Benjamini & Hochberg, 1995; Simes, 1986), the primary aim of this analysis was to guide a decision on the most promising items. The risk of applying a stringent correction for p-values would have risked the chances of a Type 2 error. Therefore, Clark-Carter's (1997) approach was taken in accepting uncorrected p-values at this stage. However, in subsequent analysis using total scores, a Bonferroni calculation has been applied.

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Testing item discrimination between groups.

To test whether individual items discriminated between groups, chi-square tests were performed (see Table 8 for results).

Results indicated that participants' responses on 15 items were associated with whether or not they were gang-affiliated. Findings from this analysis were considered alongside factor analysis in decision-making regarding item inclusion. This will be discussed in more detail subsequently.

Factorability.

CatPCA was used to reduce the 26-item version of the scale and explore underlying components (factors). The number of positive eigenvalues determines the number of factors required to represent a set of scores (Reitveld & van Hout, 1993). It is suggested that factors with an eigenvalue of one or more should be retained (Guttman-Kaiser rule; Kaiser, 1960). Although scree plots are sometimes used to visualize cut-off points, it is suggested that for studies using sample sizes of under $n = 200$ scree plots are unreliable (Yong & Pearce, 2013). Eigenvalues rather than scree plots have, therefore, been used. In an initial CatPCA analysis, seven factors emerged with eigenvalues above one (see Table 9).

It is suggested that factors with less than four items should be eliminated unless they are highly correlated ($r > .70$) and uncorrelated with other factors (Snook & Gorsuch, 1989). Hair, Anderson, Tatham and Black (1995) recommends that for a sample of 184, a loading size of .45 should be used as a cut off. Eigenvalues for items across all seven factors can be seen in Table 10.

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Table 9

Seven Dimensions and Related Eigenvalues

Model Summary		
Dimension	Cronbach's Alpha	Eigenvalue
1	.87	6.23
2	.50	1.92
3	.39	1.60
4	.26	1.33
5	.19	1.22
6	.14	1.16
7	.08	1.08

Table 10

Eigenvalues for Items Across Seven Factors

No.	Items	Factors						
		1	2	3	4	5	6	7
1	Witnessed domestic violence	.47	-.44	.45	-.04	.00	.23	.18
2	Social modelling of problem solving using violence	.53	-.40	.48	-.09	-.05	.23	.16
3	Parental supervision expectation from young person	-.61	.33	-.13	.20	.22	.04	-.01
4	Parental supervision from parent	-.37	.25	-.41	.09	.23	.09	.09
5	Presence of biological father	-.39	.16	.09	-.08	-.13	-.07	.53

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6	Familial gang membership	.42	-.18	-.15	.13	.22	-.21	-.35
7	Mother under 20 when they were born	.17	.09	.34	.17	.52	.34	-.27
8	Suspension or exclusion from school	.53	-.31	-.22	-.05	.15	-.05	.09
9	Awareness of postcode gangs in community	.33	.16	-.24	-.43	.40	.08	.33
10	Witnessed community violence	.54	.00	-.21	-.42	.22	.03	.11
11	Perception of ease of financial gain in comparison to gaining employment	.64	-.13	-.27	-.28	-.03	.06	.06
12	Presence of fear in community	.41	.49	.33	.03	.11	-.09	.11
13	Perception of comparative poverty (to peers)	.46	.27	.01	.13	-.40	.15	.18
14	Avoidance in community related to violence	.35	.58	-.00	-.17	-.02	.19	-.03
15	Safe spaces in community	.15	.04	-.31	.11	-.23	.76	-.19
16	Regular hearing of community violence	.59	.12	-.15	-.10	-.04	-.04	.02
17	Victim of violent assault	.63	-.01	.09	-.09	.10	-.08	-.34
18	Perpetrator of violent assault	.39	-.39	-.51	.20	-.05	.11	.06
19	Frequent aggressive thoughts	.64	-.00	-.08	.34	.11	.00	.29

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20	Regular nightmares	.43	.13	.20	.42	.12	.03	.16
21	Sense of foreshortened future	.61	-.03	.05	-.13	-.15	-.34	-.17
22	Hypervigilance	.64	.31	.05	-.16	.01	-.06	-.15
23	Intrusive thoughts and images of violence	.63	.25	-.04	.19	-.11	.07	-.01
24	Anxiety	.53	.40	.07	.14	-.13	-.14	-.05
25	Lack of ability to self-regulate after angry episode	.38	-.14	-.14	.48	.33	-.18	.21
26	Thoughts or behaviour controlled by something other than yourself	.42	-.02	-.23	.20	-.37	-.18	-.03

Items with loadings of 0.45 or above shown in bold

Insufficient primary loadings led to the elimination of all factors, other than factor one.

CatPCA was re-run on the items with factor loadings of 0.45 or above only (see Appendix 18). This did not result in any novel factors emerging with loadings stronger than the single factor previously identified. Factor one accounted for 43% of the total variance (see Appendix 19 a-c for CatPCA data and calculations of variance), increasing confidence that this single factor was sufficient. Table 11 contains the 14 items which loaded onto Factor 1 only, and which had loadings > 0.45.

As the chi-square results demonstrated which particular items differed between gang-affiliated and non-gang affiliated groups, these were considered, alongside the Factor 1 results, to inform decision making regarding final item inclusion. Eleven of 14 items from the CatPCA analysis were also found to be significantly associated with gang affiliation in the earlier chi-squared analysis (see Table 12). Only 4 of the 15 items identified as differing

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between the gang-affiliated and non-gang affiliated groups by the chi-squared analysis were not accounted for by Factor 1 (items 4, 5, 9 and 18).

CatPCA can detect underlying components, but allows for theoretical models to influence practical decisions, regarding models. A discussion with the local expert group, research assistants, primary researcher and statistician followed. It was decided that items loading onto Factor 1 appeared to be describing ‘historic lack of safety and current perception of threat’. Items 4, 5, 9 and 18 fitted this construct. Although these items had loadings of $< .45$, based on the chi-squared analysis, they appeared to differentiate between groups to some degree ($> .3$). It was agreed that if the addition of these items would not affect the internal consistency of the factor significantly, they should be included. Subsequent ROC analysis supported this decision, as inclusion of these items led increased discriminatory ability of the overall measure (see Appendix 20 for expert meeting notes for inclusion of items, and 23a for ROC analysis on only 11 items).

Table 11

Items Loading onto Factor 1

Item number	Items	Factor Loadings
1	Witnessed domestic violence	.469
2	Social modelling of problem solving using violence	.526
3	Parental supervision expectation from young person	-.614
8	Suspension or exclusion from school	.525
10	Witnessed community violence	.540
11	Perception of ease of financial gain in comparison to gaining employment	.637
13	Perception of comparative poverty (to peers)	.458
16	Regular hearing of community violence	.590
17	Victim of violent assault	.629
19	Frequent aggressive thoughts	.644
21	Sense of foreshortened future	.611
22	Hypervigilance	.637
23	Intrusive thoughts and images of violence	.632
24	Anxiety	.526

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Table 12

Significant Items Identified by Chi-square Results and Loading onto Factor 1

Item number	Variable	Significance level (crosstabs/ chi-sq.)	Items loading onto Factor 1
1	Witnessing domestic violence	.00	*
2	Social modelling of problem solving using violence	.01	*
3	Lack of parental supervision A	.00	*
4	Lack of parental supervision B	.00	x
5	Absence of biological father	.00	x
6	Familial gang membership	.60	x
7	Mother under 20	.42	x
8	Suspension or exclusion from school	.00	*
10	Witnessing community violence	.00	*
10	Awareness of postcode gangs	.02	x
11	Perception of ease of financial gain in comparison to gaining employment	.00	*
12	Fear in community setting	.55	x
13	Perception of comparative poverty (to peers)	.07	*
14	Avoidance in community	.97	x
15	Lack of safe space in community	.47	x
16	Hearing about community violence	.01	*
17	Victim of violent assault	.00	*
18	Perpetrator of violent assault	.00	x
19	Frequent aggressive thoughts	.00	*
20	Regular nightmares	.42	x
21	Sense of foreshortened future	.00	*
22	Hypervigilance	.00	*
23	Intrusive thoughts and images of violent material	.27	*
24	Anxiety	.34	*
25	Lack of ability to self-regulate	.16	x
26	Thoughts and behaviour controlled by something other than themselves	.52	x

Items in grey were not deemed significant by the chi-squared analysis. Items marked with an * have been accounted for by Factor 1. Items marked with an x have not been accounted for by Factor 1.

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Factor 1 included three items that the chi-square results indicated not to be of importance (items 13, 23 and 24). Although at least the latter two of these items potentially fitted with this construct (items 23 and 24), it was decided that if removal of these items would not affect the internal consistency of the measure significantly, they should be removed. This was partly as the focus was on developing a measure to identify a difference between gang-affiliated and non-gang affiliated groups, and chi-square results suggested that these items would not. Furthermore, other items did discriminate, and the elimination of these weaker items would reduce the length of the measure.

Internal consistency.

The internal consistency of Factor 1 was assessed by calculating Cronbach's α coefficients (Cronbach, 1951) (see Appendix 21). George and Mallery (2003) suggested the following guidelines for interpreting Cronbach's α : “ $\geq .9$ – Excellent, $\geq .8$ – Good, $\geq .7$ – Acceptable, $\geq .6$ – Questionable, $\geq .5$ – Poor, and $< .5$ – Unacceptable” (p. 231). Using this to guide interpretation of the results, factor 1 demonstrated good internal consistency when all items were included (Cronbach's $\alpha = .87$), and acceptable internal consistency (Cronbach's $\alpha = .78$) when only the 14 items with loading values $> .45$ were retained.

Cronbach's α was re-run when the four items identified as differentiating between gang-affiliated and non-gang-affiliated groups (by chi square results) were added to the 14 items (see Table 11). This resulted in a good Cronbach's α of .84, validating the inclusion of these items due to their theoretical 'fit,' and also due to internal consistency being improved.

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Table 13

Final GARM Item Inclusion and Related Questions

Item Number	Item	Actual Question
1	Witnessing domestic violence	Had you witnessed violence at home?
2	Social modelling of problem solving using violence	Did the people who lived with you sort out problems using violence?
3	Lack of parental supervision (A)	Did you usually tell your family where you were going when you went out?
4	Lack of parental supervision (B)	When you got home from school, did anyone ask you how your day had been?
5	Absence of biological father	Was your biological father living at home with you?
8	Suspension or exclusion from school	Did you get kicked out of school at any point?
9	Awareness of postcode gangs	Were you aware of postcode gangs in your area?
10	Witnessing community violence	Had you witnessed violence in your area?
11	Perception that it's easier to make money through gang involvement than other routes	Did you think it was easier to make money through gang involvement rather than getting a job?
16	Hearing about community violence	Had you regularly heard about people being shot, stabbed or killed in your area?
17	Victim of violent assault	Had you been badly beaten up?
18	Perpetrator of violent	Had you been in trouble for fighting or hurting other people?

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	assault	
19	Frequent aggressive thoughts	Did you often have aggressive thoughts?
21	Sense of foreshortened future	Did you have the sense that life would be short?
22	Hypervigilance	In your area, did you feel that you had to look over your shoulder all the time to stay safe?

The three items not identified as significant by chi square results (see Table 12), but which Factor 1 had originally included, were removed to check whether eliminating these items affected internal consistency. Whilst their prior inclusion suggested a small increase in internal consistency (Cronbach's $\alpha = .86$), statistical advice was that this was likely a mathematically-enhanced figure due to the additional number of items, and too slight to warrant their inclusion. As it was decided that these items didn't fit the construct as well as others, the results supported their elimination. The above analyses led to the decision to retain a 15-item measure (Cronbach's $\alpha = .84$) (final items can be seen in Table 13).

As items were informed by CatPCA and chi-square, the process of weighting would have likely led to an unreliable or uneven result. Therefore, each item was treated with equal importance in contributing to the final factorial score, and weight was not considered in the computation of final scores. The composite factorial score for risk of gang affiliation was thereafter computed by counting the number of items (ranging from 0–15) to which participants had responded positively.

A higher score would, therefore, indicate a greater risk of gang affiliation. Computing a total score allowed for subsequent analysis to compare group scores and test the discriminative ability of the GARM.

Differences in composite factorial scores between groups.

In comparing the GARM scores between the gang-affiliated group and non-gang affiliated group, the non-parametric Mann-Whitney test indicated that scores were significantly greater for the gang-affiliated group ($Md = 8.25$, $n = 102$) than the non-gang affiliated group ($Md = 4.60$, $n = 81$), $U = 1832.00$, $z = -6.45$, $p < .001$, $r = -.48$.

Recall that the gang-affiliated group also contained the more 'pure' matrix gang affiliated group, meaning that the gang affiliated group could be sub-divided into two groups (gang affiliated and matrix gang affiliated). To test the null hypothesis (that these groups would score similarly), a Kruskal-Wallis test was undertaken. Results further supported a statistically significant difference in GARM scores between the three groups (matrix gang-affiliated, $n = 46$; self-reporting gang-affiliated, $n = 56$ and non-gang affiliated, $n = 81$), $\chi^2 (2, n = 183) = 55.12$, $p < .001$ (see Table 14). As expected, the matrix gang-affiliated group recorded the highest median score ($Md = 9.80$), the self-reporting gang-affiliated group scored next highest ($Md = 6.98$) and the non-gang affiliated group scored the lowest ($Md = 4.59$).

Use of the post-hoc Bonferroni correction ($.05/3 = .017$) supported the conclusion that the mean scores of all three groups differed significantly, indicating that the null hypothesis could be rejected.

Further exploration of overall scores of risk between the three groups (gang-affiliated, matrix gang-affiliated and non-gang affiliated) was undertaken using Mann-Whitney tests (see Appendix 22).

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Table 14

Kruskal Wallis Test Results

Category	N	Mean Rank	Chi-Square	df	P-value
gang-affiliated group	56	97.42	55.105	2	.00
non gang-affiliated group	81	63.62			
gang-affiliated group matrix	46	135.38			
Total	183				

As expected, when the matrix gang affiliated data was removed from the gang-affiliated data, scores remained significantly greater for the self-reporting gang-affiliated group ($Md = 6.98$, $n = 56$) than for the non-gang affiliated group ($Md = 4.59$, $n = 81$), $U = 1405.50$, $z = -3.80$, $p = < .001$, $r = -.32$. When comparing the matrix gang-affiliated group ($Md = 9.80$, $n = 46$) with the non-gang affiliated group ($Md = 4.60$, $n = 81$), this difference was even more marked ($Md = 4.60$, $n = 81$), $U = 426.50$, $z = -7.24$, $p < .001$, $r = -.64$.

It seemed that although both the gang-affiliated and matrix gang-affiliated group differed significantly in comparison to the non-gang affiliated group, the gang-affiliated group and matrix gang-affiliated group might also perform differently from one another. Indeed, further analysis revealed at GARM scores were greater in the matrix gang-affiliated group ($Md = 9.80$, $n = 46$) than the self-reporting gang-affiliated group ($Md = 6.98$, $n = 56$), $U = -729.00$, $z = -3.772$, $p = < .001$, $r = -.37$).

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These results suggested that discriminatory analysis should be run twice; firstly between the gang-affiliated group and non-gang affiliated group, and secondly between the matrix gang-affiliated group and non-gang affiliated group (in case the purer sample would result in different levels of discriminative power).

Discriminant validity.

The discriminant validity of GARM was examined through ROC analysis. ROC curves provide a complete measure of accuracy by plotting discriminative ability (true positive rate by false positive rate) across the whole spectrum of potential cut offs (Kumar & Indrayan, 2011).

For the purposes of this study, every cut-off point would, for example, indicate a score above which participants are judged to be at risk of gang-affiliation. The analysis in this instance would compute the number of true positive cases (those correctly identified as ‘at risk’) and the number of false positive cases (those identified as ‘at risk’ when in fact they are not) for each possible cut-off. By combining these numbers, it is possible to calculate the specificity and sensitivity indices (how able the measure is to discriminate accurately between participants). The diagonal line represents a test that is no better than chance at discriminating between participants, and the closer the curve is to the top left corner, the better the measure is at accurately discriminating between participants.

Initially, ROC curves were calculated for discriminatory ability between the gang-affiliated group and the non-gang affiliated group. Subsequently, ROC curves were calculated between the matrix gang-affiliated group and the non-gang affiliated group.

ROC curves can be seen in Figures 1 and 2. Results relating to the area under the curve (AUC) can be seen in Table 15. AUC provides an overall measure of discrimination, with a

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score of one (1.0) representing perfect discrimination and AUC greater than 0.9 is considered excellent, 0.8 to 0.9 very good, 0.7 to 0.8 good, 0.6 to 0.7 average, and <0.6 poor (Choi, Jovic, Kay, Main & Leake, 1998). ROC curves for the total score in both analyses (Figure 1 and Figure 2) were above the diagonal 'line'. Results demonstrated a highly significant ($p = .00$) AUC of .78, which would classify as a 'good' discriminatory measure and suggest that GARM is able to positively discriminate the gang-affiliated group from the non-gang affiliated group, when the gang-affiliated group included self-reporting gang-affiliated participants (see Figure 1 and Appendix 23 for full ROC results).

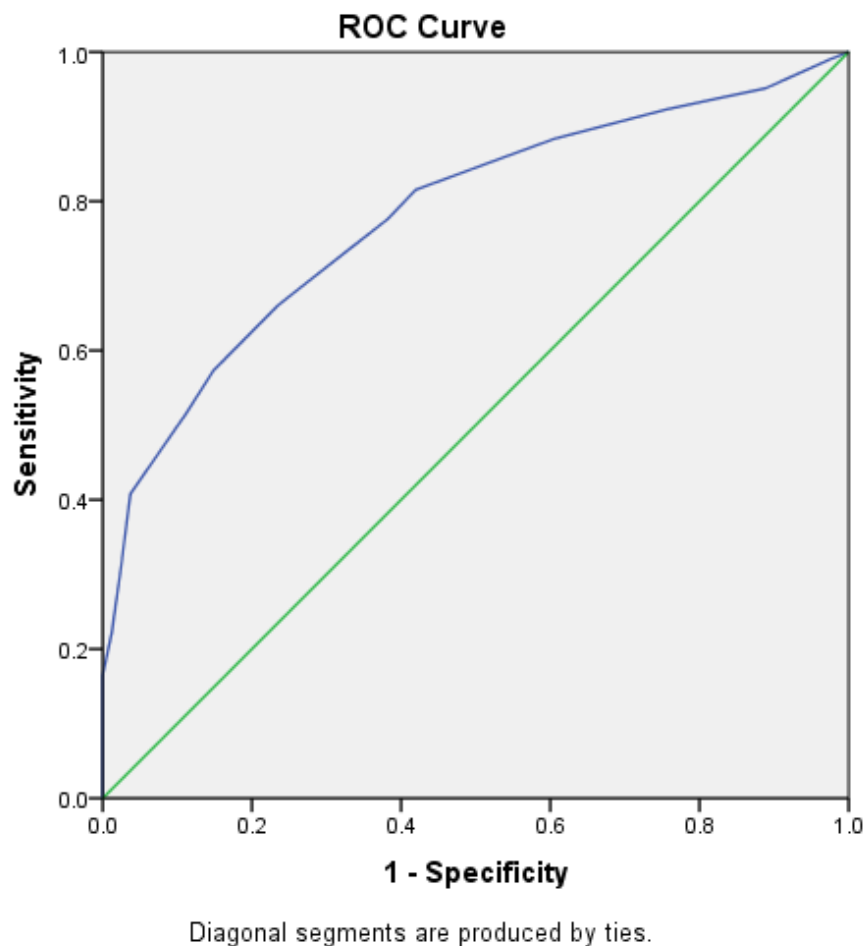


Fig. 1: ROC curve for GARM total score (total gang-affiliated group compared to total non-gang affiliated group)

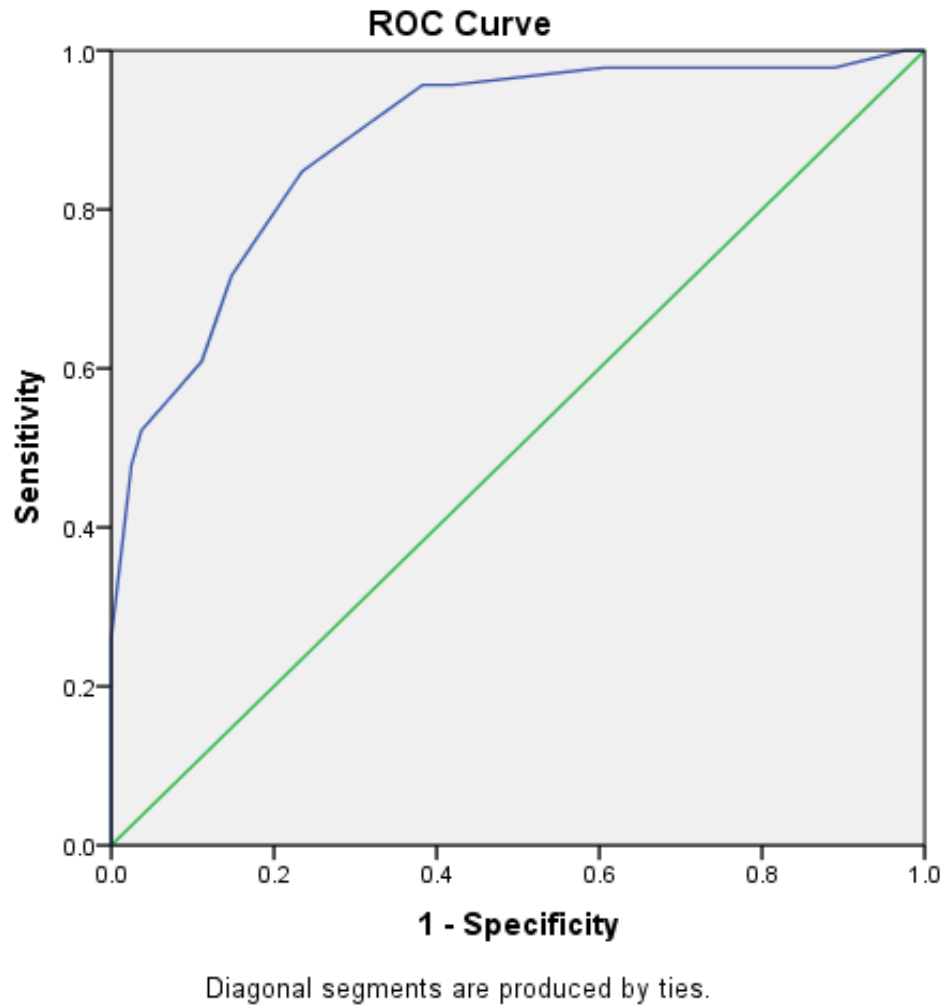


Fig. 2: ROC curve for GARM total score (matrix gang-affiliated group compared to total non-gang affiliated group)

However, when only the ‘purer’ sample (matrix gang-affiliated group) was compared to the non-gang affiliated group, the curve is closer to the top left corner ‘perfect’ axis (see Figure 2). This information is supported quantitatively by a highly significant ($p = .00$) AUC of .89, suggesting that the GARM is a ‘very good’ discriminatory measure of gang affiliation when utilising a ‘pure’ sample. These results support the discriminative ability of GARM as a measure of gang-affiliation.

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Table 15

AUC Results for GARM (when non-gang affiliated group is compared to gang-affiliated group including matrix gang-affiliated group, and when non-gang affiliated group is compared to self-report gang-affiliated group only)

Comparison Groups	AUC	Std. Error	Significance (p value)	95% Confidence Interval	
				Lower Bound	Upper Bound
Non-gang affiliated group and gang affiliated group	.780	.034	.000	.715	.846
Non-gang affiliated group and matrix gang affiliated group	.886	.031	.000	.825	.946

Although the analysis of the matrix gang-affiliated group and non-gang affiliated group resulted in a higher AUC, it was considered that using this AUC to calculate cut-off scores might result in young people at a lower level risk of gang affiliation not being accurately identified as in need of support. As the measure is being designed as a preventative measure, a cut-off point was calculated from the first ROC analysis (see Figure 1), where self-reporting gang-affiliated participants were included in the gang-affiliated group.

Likelihood ratio positive and negative (LR_{\pm}) are defined in terms of sensitivity and specificity and can be identified at various points of the AUC. Youden's Index uses these ratios to calculate optimal cut-off scores (maximum sensitivity + specificity - 1) (Youden,

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1950), with the highest Youden's Index score guiding the cut off point for a measure (see Table 16).

Table 16

Calculating Optimal Cut Off Scores

Cut-off scores	Sensitivity	1-Specificity	Youden's Index Score
-1	1	1	0
0.5	.99	.98	.02
1.5	.95	.89	.06
2.5	.92	.75	.17
3.5	.88	.61	.28
4.5	.82	.42	.40
5.5	.78	.38	.39
6.5	.66	.24	.43
7.5	.57	.15	.43
8.5	.52	.11	.40
9.5	.41	.04	.37
10.5	.31	.03	.29
11.5	.22	.01	.21
12.5	.17	0	.17
13.5	.08	0	.08
14.5	.04	0	.04
16.0	0	0	0

The highest Youden's score was 0.43, which correlated with a cut off score of both 6.5 and 7.5. Sensitivity reflects the probability that a test result will be positive when gang-affiliation is present (true positive). Using a cut off score of 6.5, this would equate to .66 (66 % of the time). Specificity is the probability that a test result will be negative when gang-affiliation is not present (true negative). Using a cut off score of 6.5, this would equate to .77 (77%) of the time. At the 7.5 cut off the sensitivity was .57, and the specificity .85. As all responses were one point answers (with half points impossible), a figure between these was selected, resulting in a cut off score of 7. The above finding would suggest that if respondents

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answered in a positive direction, to seven or more items out of 15, they would be identified as gang-affiliated.

This analysis demonstrated that items informed by theory and practice culminated in a measure (GARM) with discriminatory ability (as demonstrated by adequate sensitivity and specificity in detecting gang-affiliation) (see Table 17).

T-GARM

The GARM was tested on participants between the ages of 16–25 years (reporting retrospectively about their experiences when they were aged 11) and, accordingly, questions were worded in the past tense. Although GARM is of use in its own right, the final aim of this study was to produce a predictive measure, to guide early intervention and prevention. Therefore, questions from the GARM needed to be adjusted, to situate them currently, so that young people aged eleven could complete it (see Table 18). This process resulted in a predictive test measure; (T-GARM).

Assuming that the T-GARM has similar validity to the GARM, a total possible score of 15 would demonstrate that all questions were answered in the direction of gang-affiliation. Respondents scoring seven or more would, therefore, likely be at risk of vulnerability to gang-affiliation without appropriate support.

An opportunistic group (n = 5) of 11–13 year olds (known to the main researcher) reviewed the wording and deemed it as accessible to this age group, suggesting that this measure could be applied in the first year of secondary school.

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Table 17

Final GARM Items

Question number	Question
1	Had you witnessed violence at home?
2	Did the people who lived with you sort out problems using violence?
3	Did you usually tell your family where you were going when you went out?
4	When you got home from school, did anyone ask you how your day had been?
5	Was your biological father living at home with you?
6	Did you get kicked out of school at any point?
7	Were you aware of postcode gangs in your area?
8	Had you witnessed violence in your area?
9	Did you think it was easier to make money through gang involvement rather than getting a job?
10	Had you regularly heard about people being shot, stabbed or killed in your area?
11	Had you been badly beaten up?
12	Had you been in trouble for fighting or hurting other people?
13	Did you often have aggressive thoughts?
14	Did you have the sense that life would be short?
15	In your area, did you feel that you had to look over your shoulder all the time to stay safe?

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Table 18

T-GARM Questions and Scores

Item Number	Reworded question	Score
1	Do you usually tell your family where you are going when you go out?	Yes=0 No=1
2	Is your biological father living at home with you?	Yes=0 No=1
3	Have you been kicked out of school at any point?	No=0 Yes=1
4	Have you witnessed violence in your area?	No=0 Yes=1
5	Do you think it is easier to make money through gang involvement rather than getting a job?	No=0 Yes=1
6	Have you been badly beaten up?	No=0 Yes=1
7	Have you been in trouble for fighting or hurting other people?	No=0 Yes=1
8	Do you have the sense that life will be short?	No=0 Yes=1
9	In your area, do you feel that you have to look over your shoulder all the time to stay safe?	No=0 Yes=1
10	When you get home from school, does anyone ask you how your day has been?	Yes=0 No=1
11	Have you witnessed violence at home?	No=0 Yes=1
12	Do you often have aggressive thoughts?	No=0 Yes=1
13	Do the people who you live with sort out problems using violence?	No=0 Yes=1
14	Have you regularly heard about people being shot, stabbed or killed in your area?	No=0 Yes=1
15	Are you aware of postcode gangs in your area?	No=0 Yes=1

Scores for answers correlating to a positive direction of gang-affiliation were allocated in the right-hand column.

Discussion

This study aimed to create a measure of risk for male gang-affiliation, to more effectively target early intervention and prevention. Input from experts, and consideration of previous review findings (Raby & Jones, submitted) led to the initial development and pilot testing of a 58-item measure. Following analysis, this was reduced to a 26-item measure, which performed well with participants and had high construct validity (based on ‘speak alouds’ and ‘exit interview’ feedback).

From the 26 items, the research assistants, primary researcher, statistician and local expert group discussed CatPA and chi-square results theoretically. A single-factor solution (historic lack of safety and current perception of threat) explained 43% of the variance, and a final 15-item measure (which included items deemed significant from the chi-square analysis) formed the final GARM.

Internal consistency for the final GARM was good, and ROC analysis indicated significant discriminative ability between gang-affiliated and non-gang affiliated individuals, with AUCs at a ‘good’ (between the gang-affiliated group and the non-gang affiliated group) or ‘very good’ (between the matrix gang-affiliated group and non-gang affiliated group) level.

The 15 items forming the GARM (which fitted the construct of ‘historic lack of safety and current perception of threat’) were associated with a lack of parental supervision, school exclusion, a lack financial security, violent victimisation, violence exposure, social modelling of violence, violence perpetration and PTSD symptomology.

This construct fitted the emergent meta-narrative from the systematic review (Raby & Jones, submitted), linking a failure to safeguard young people with gang-affiliation, and identifying increased violence exposure and associated psychological consequences; namely developmental trauma or PTSD (Institute of Psychiatry, Gangs Conference, 2015; Coid et al.,

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2013). Interestingly, neurodevelopmental studies of early attachment difficulties and complex trauma have associated a historic lack of safety with ongoing hypervigilance and increased threat perception (Meloy, 1992; Rogers, Harvey & Law, 2015; Schore, 2005).

These risks were identified as having been experienced by participants by the age of 11, presenting a robust argument for early intervention and prevention. It would additionally seem plausible that proactively meeting these needs could increase resilience, and reduce the lure of gangs. Results of this study were consistent with previous theoretical findings regarding the compound risk exposure experienced by gang-affiliated individuals (Esbensen & Huizinga, 1993; Thornberry, Hawkins & Krohn, 1998; Hill et al., 1999) and the cut off score of 7 was of particular interest given Hill et al.'s (1999) assertion that gang-affiliated young people exposed to ≥ 7 risk factors were 13 times more likely to become gang-affiliated than their control group.

Considering the proposed epidemiological core infection model (Laumann & Youm, 1999; Fagan et al., 2007), this area of policy and practice requires assertive attention to ensure that gang-related violence is not offered fertile ground to spread (particularly in urban areas characterised by low socio-economic status) (Pyrooz, 2014; Gilman et al., 2003; Dupure et al., 2007). However, this is likely to create challenges, given the recent drastic cuts to UK local authority budgets (Local Authority Association, 2014).

Limitations

A number of limitations impact upon the strength of these conclusions. Many potential predictor items identified by the systematic review (Raby & Jones, submitted) were excluded from the measure based on lack of ability to self-report (due to potential lack of insight, lack of knowledge or performance of items in the pilot test). Owing to the retrospective nature of the study, there was a potential for reporting bias. Furthermore, participants were recruited

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from one Borough, and testing of its properties with other samples is necessary before drawing generalizable conclusions. Thus stated, some generalisation might be possible in areas with similar demographic profiles, within the U.K.

Although the advice received from the experts by experience group was seen as valid, not having full demographic data for the pilot group makes it uncertain as to whether this group presented with a similar demographic profile to the main study group. However, the tight inclusion criteria and research assistant feedback suggested that this was the case, and reanalysis with removal of pilot data indicated that the inclusion of this group did not alter the pattern of findings in the main study.

The lack of previously validated gang measures introduced some difficulty in robustly assuring that participants had been allocated into gang or non-gang affiliated sample groups. However, an attempt to reduce this ambiguity was made through use of triangulated measures (self-report, local community intelligence and the gang matrix), and an analytic approach which took account of this.

The objective to design a gang-affiliation risk measure has been met by the GARM. However, GARM is based on patterns of retrospective self-reported risk exposure, and the prospective T-GARM would require a longitudinally designed study, to validate its predictive utility.

Clinical Implications

Results of this study suggest that gang-affiliated participants had been less protected and more frequently exposed to violence (both at home and in the community) by the age of 11, than non-gang affiliated participants. Violent experiences frequently result in symptoms of

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‘PTSD’ or ‘developmental trauma’ (Steiner, Garcia, & Matthews, 1997; van der Kolk et al., 2007; Schmid, Petermann & Fegert, 2013).

Although conduct disorder (CD) (Lahey, Gordon, Loeber, Stouthamer-Loeber, & Farrington, 1999; Howell & Egley, 2005; Madden, 2013) and antisocial personality disorder (Coid et al., 2013; Valdez et al., 2000) have also been associated with gang-affiliation, it is essential that clinicians accurately differentiate conduct disorder presentations from post-traumatic reactions to violence exposure, or behaviours intrinsic to gang-affiliation. For example, running away from home on two occasions (The Diagnostic and Statistical Manual of Mental Disorders 5th ed. (DSM-V); American Psychiatric Association (APA), 2013) could be explained by avoiding violence, or young people’s involvement in ‘county lines’ (Great Britain Home Office, 2011). Going missing could, therefore, indicate safeguarding concerns relating to exploitation, as opposed to being symptomatic of an intrinsic mental health difficulty. It would appear more likely (given that violence exposure and violent victimisation defined this group from the control group) that antisocial behaviour has manifested as a fear-based post-traumatic reaction to perceived threat, or due to reduced empathy resulting from developmental trauma and social modelling of problem solving using instrumental violence (van der Kolk & d’Andrea, 2010).

It has been suggested that PTSD symptomology is experienced differently by gender (Kerig & Becker, 2010). Dulmus and Hilarski (2006) found that boys who had witnessed domestic violence in their early years frequently displayed externalised (as opposed to internalised) PTSD symptoms. Maschi et al. (2008) discovered a causal link for externalised PTSD symptoms, tempered by gender, resulting in males ‘acting out’ or demonstrating offending behaviour in response to childhood victimisation (contrasting to females who tended to internalise their aggression). They consequently argue for a gender sensitive response to developmental trauma.

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The findings of this study echoed this research. The sense of ‘going it alone’ to survive that Maschi et al (2008) describe in male trauma survivors was as evident in the symptoms this cohort reported (aggressive thoughts, sense of foreshortened future, hypervigilance and violence perpetration) as the internalised ones they denied (fear, avoidance, anxiety and nightmares) and the self-protective style with which this was reported (see Appendix 24 for just one example). That internalised symptoms did not discriminate between groups, may therefore reflect on the gender mediation of PTSD symptomology, and reporting bias.

Identification and treatment of developmental trauma or PTSD can reduce cyclic victimisation and violence commission (Ruchkin et al., 2007). Robust age-appropriate screening measures and evidence based treatment should be employed to identify and treat those in need of mental health support, and reduce ongoing offending behaviour (Paton, Crouch & Camic, 2009). Reporting internalised post-traumatic symptoms could feel understandably challenging for this cohort (given that they have experienced a historic lack of protection from harm, or violence exposure from primary caregivers). It therefore, seems appropriate to recommend that diagnostic interviews are sensitive to the likelihood of attachment difficulties, developmental trauma and the under-reporting of internalised symptoms.

The GARM should enable individuals vulnerable to gang-affiliation to be better identified. If offered preventative support, evidence suggests that gang-affiliated individuals are more committed to treatment than non-gang affiliated individuals (Coid et al., 2013). However, postcode territories, the stigma of mental health difficulties, the risk of being perceived as weak, and an inherent lack of trust in authority could make accessing help challenging. This should be considered when designing interventions, to overcome potential obstacles to engagement (UK Department of Health, 2013; MAC-UK, personal communication, 2015). Partner agencies from across the statutory and voluntary sector should work together to

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ensure accessible services, tailored to meet the holistic needs of gang-affiliated young people.

Given the results of this study regarding the impact of traumatic exposure, interventions should feature specialist psychological support.

Research Implications

GARM acts as an effective discriminatory tool between gang-affiliated and non-gang-affiliated participants, and could, therefore, be used as a valid measure for sample group selection in prospective research.

Future testing of the GARM and T-GARM should ensure test/retest reliability and stability over time. Additional analysis of the measure will confirm validity (across geographical settings), at which stage the measure could be standardised as a screening tool. If deemed ethical, longitudinal studies involving use of the T-GARM measure would test its validity as a predictive tool.

Studies utilising a RCT design and focussing on interventions with young people identified as at risk of gang-affiliation by the T-GARM could enable a combined screening and effective early intervention model for gang affiliation prevention to evolve.

Conclusion

The previous lack of a validated screening measure to identify young people at risk of gang-affiliation in the UK, made early identification of vulnerable individuals and appropriate referrals for preventative support challenging. The GARM was created to remedy this situation. GARM items were informed by systematically-reviewed evidence, national and local expertise and experts by experience. When tested on gang-affiliated and non-gang-affiliated participants, the GARM demonstrated high internal consistency and good discriminatory ability. The T-GARM requires longitudinal research to affirm its predictive utility.

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The development of these measures provide an important first step in identifying a highly vulnerable group. The results of the wider study offer suggestions for increasing resilience and desistance in gang-affiliated cohorts, and areas of likely support needs. A specialist role for mental health practitioners seemed necessary, given the historic violence exposure experienced by this group. Multi-agency working was further recommended, due to anticipated complex needs.

If the increased threat to public safety presented by gang violence is explained through an epidemiological core infection model, results of this study would propose that accurate early identification of young people at risk of gang-affiliation and preventative holistic support (including targeted mental health treatment) would likely be a highly-effective antidote.

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Appendix A

Quality Standards Criteria

Removed for Copyright Purposes

Appendix B: Scoring of systemic review papers

Scoring of systematic review papers

No.	Questions for quantitative studies
1	Is the question or objective sufficiently described?
2	Is the design evident and appropriate to answer the study question?
3	Is the method of subject selection (and comparison group selection, if applicable) or source of information input variables (eg., for decision analysis) described and appropriate?
4	Are the subject (and comparison group, if applicable) characteristics or input variables information (eg., for decision analysis) sufficiently described?
5	If random allocation to treatment group was possible, is it described?
6	If interventional and blinding of investigators to intervention was possible, is it reported?
7	If interventional and blinding of subjects to intervention was possible, is it reported?
8	Are outcome and (if applicable) exposure measure(s) well defined and robust to measurement/ misclassification bias? And are means of assessment reported?
9	Is the sample size appropriate?
10	Is the analysis described and appropriate?
11	Is some estimate of variance (eg., confidence intervals, standard errors) reported for the main outcomes and results (eg., those directly addressing the study question/ objective upon which the conclusions are based)?
12	Are confounding factors controlled for?
13	Are results reported in sufficient detail?
14	Do the results support the conclusions?
Total score	Total sum of scores are calculated by adding yes scores (2), partial scores (1) or no scores (0). Total possible sum is 28, and the summary score is calculated by adding the total score and then dividing by the total possible sum.

Appendix B: Scoring of systemic review papers

Author	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Score
1. Alleyne & Wood (2010)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: 0.82
2. Alleyne & Wood (2011)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: 0.95
3. Alleyne & Wood (2013)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 22 Total Possible Sum: 22 Summary Score: 1
4. Ang et al (2012)	Partial (1)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	No (0)	Yes (2)	No (0)	Yes (2)	No (0)	Partial (1)	Partial (1)	Total Sum: 11 Total Possible Sum: 22 Summary Score: 0.5
5. Aryan et al. (2005)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	No (0)	Partial (1)	Partial (1)	Partial (1)	No (0)	No (0)	Partial (1)	Total Sum: 12 Total Possible Sum: 22 Summary Score: .55
6. Barnes et al (2012)	Partial (1)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: 0.77
7. Barnes, Beaver & Miller (2010)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	No (0)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .90
8. Baskin, Quintana & Slaten (2014)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77

Appendix B: Scoring of systemic review papers

9. Beaver et al (2009)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: 0.95
10. Bennett & Holloway (2004)	Partial (1)	Partial (1)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	No (0)	No (0)	No (0)	Yes (2)	Partial (1)	Total Sum: 12 Total Possible Sum: 22 Summary Score: 0.55
11. Biswas, Olate, Salas-wright & Vaughn (2011)	Partial (1)	Partial (1)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	No (0)	Partial (1)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68
12. Bjerregaard (2002)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: 0.45
13. Bjerregaard (2010)	Yes (2)	Partial (1)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
14. Bradshaw , Waasdorp, Goldweber & Johnson (2012)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: .95
15. Brooks et al (2011)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	No (0)	Yes (2)	Partial (1)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: 0.45
16. Brownfield (2003)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	No (0)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: 0.86
17. Brownfield (2012)	Yes (2)	Yes (2)	Partial (1)	No (0)	N/A	N/A	N/A	No (0)	Yes (2)	Yes (2)	No (0)	Partial (1)	No (0)	Yes (2)	Total Sum: 12 Total Possible Sum: 22

Appendix B: Scoring of systemic review papers

															Summary Score: .55
18. Brownfield et al. (2001)	Partial (1)	Partial (1)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68
19. Brownfield & Thompson (2002)	Yes (2)	Yes (2)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	?	Partial (1)	No (0)	No (0)	Partial (1)	Yes (2)	Total Sum: 8 Total Possible Sum: 20 Summary Score: .4
20. Cadwallar & Cairns (2002)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: 0.64
21. Cartwright, Howard & Reuterman (1970)	Partial (1)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	No (0)	Partial (1)	Yes (2)	Yes (2)	Partial (1)	No (0)	Yes (2)	Partial (1)	Total Sum: 13 Total Possible Sum: 22 Summary Score: .59
22. Chu, Daffern, Thomas & Lim (2011)	Partial (1)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 11 Total Possible Sum: 22 Summary Score: .5
23. Coid et al. (2013)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: .95
24. Corcoran, Washington & Meyers (2005)	Partial (1)	Partial (1)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	Yes (2)	No (0)	Yes (2)	Yes (2)	Total Sum: 13 Total Possible Sum: 22 Summary Score: .59
25. Craig et al. (2002)	Yes (2)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	No (0)	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22

Appendix B: Scoring of systemic review papers

															Summary Score: .73
26. Curry & Spergal (1990)	Partial (1)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 13 Total Possible Sum: 22 Summary Score: 0.59
27. Danyko et al. (2002)	Partial (1)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 13 Total Possible Sum: 22 Summary Score: .59
28. DeLisi et al. (2009)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
29. DeLisi et al. (2013)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
30. Dishion et al (2005)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: 0.86
31. Dmitrieva, Steinberg, Piquero & Fagan (2014)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .91
32. Dukes at al (1997)	Partial (1)	Yes (2)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: 0.45
33. Dupere et al (2007)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: 0.82

Appendix B: Scoring of systemic review papers

34. Egan & Beadman (2011)	Partial (1)	Partial (1)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Total Sum: 16 Total Possible Sum: 22 Summary Score: .72
35. Eitle 2004	Yes (2)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
36. Esbensen & Carson (2012)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	N/A	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 20 Summary Score: .73
37. Esbensen , Peterson, Taylor & Freng (2009)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
38. Esbensen, Deschenes & WInfree (1999)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22 Summary Score: .73
39. Estrada et al. (2013)	Partial (1)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	No (0)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
40. Evans et al. (1996)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68
41. Evans et al. (1999)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Partial (1)	No (0)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22 Summary Score: .73

Appendix B: Scoring of systemic review papers

42. Farmer & Hairston Jr (2013)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Partial (1)	Partial (1)	Partial (1)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
43. Florian-Lacy et al. (2002)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Yes (2)	Partial (1)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68
44. Freng et al (2012)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: 0.68
45. Friedman et al (1975)	Yes (2)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	Yes (2)	No (0)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: 0.82
46. Gatti et al (2005)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: 0.77
47. Gilman, Hill, Hawkins, Howell & Kosterman (2014)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .91
48. Griffin & Hepburn (2006)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22 Summary Score: 0.72
49. Harper et al (2008)	Yes (2)	Partial (1)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 13 Total Possible Sum: 22 Summary Score: 0.59
50. Hermann et al (1997)	Partial (1)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22

Appendix B: Scoring of systemic review papers

															Summary Score: 0.73
51. Hill et al. (1999)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	No (0)	Partial (1)	Partial (1)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: .64
52. Hope & Damphouse (2002)	Yes (2)	Yes (2)	Yes (2)	No (0)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
53. Kakar (2005)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
54. Kakar (2008)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	Partial (1)	No (0)	Partial (1)	Partial (1)	Total Sum: 14 Total Possible Sum: 22 Summary Score: .64
55. Katz, Webb, Fox & Schaffer (2011)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: .95
56. King et al. (2013)	Partial (1)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
57. Kissner & Pyrooz (2009)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	No (0)	No (0)	Partial (1)	Yes (2)	Partial (1)	Total Sum: 14 Total Possible Sum: 22 Summary Score: 0.64
58. Krohn et al. (2011)	Partial (1)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82

Appendix B: Scoring of systemic review papers

59. Lachman et al. (2013)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
60. Lahey et al 1999	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .91
61. Larson & Busse (1998)	No (0)	Partial (1)	Partial (1)	No (0)	N/A	N/A	N/A	No (0)	Yes (2)	No (0)	No (0)	No (0)	Partial (1)	Yes (2)	Total Sum: 7 Total Possible Sum: 22 Summary Score: 0.32
62. Li et al (2002)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
63. Liu & Fung (2005)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	No (0)	Partial (1)	No (0)	No (0)	Yes (2)	No (0)	Total Sum: 12 Total Possible Sum: 22 Summary Score: .55
64. Lurigio, Flexon & Greenleaf (2008)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
65. Luyt & Foster (2001)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	No (0)	Yes (2)	Yes (2)	No (0)	No (0)	Partial (1)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: 0.64
66. Lyon & Hall (1992)	Partial (1)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68

Appendix B: Scoring of systemic review papers

67. McDaniel (2012)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	No (0)	Partial (1)	Yes (2)	Total Sum: 15 Total Possible Sum: 22 Summary Score: 0.68
68. Melde & Esbensen (2011)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
69. Melde, Diem & Drake (2012)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
70. Ngai, Cheung, and Ngai (2007)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	No (0)	Yes (2)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77
71. Olate, Salas-wright & Vaughn (2012)	Yes (1)	Partial (1)	Partial (1)	Yes (2)	N/A	N/A	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Total Sum: 14 Total Possible Sum: 22 Summary Score: .63
72. Palmer & Tilley (1995)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	No (0)	No (0)	Partial (1)	Yes (2)	Total Sum: 13 Total Possible Sum: 22 Summary Score: .59
73. Pederson (2014)	Partial (1)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .91
74. Porter & Alison (2004)	Partial (1)	Partial (1)	No (0)	No (0)	N/A	N/A	N/A	No (0)	No (0)	Partial (1)	No (0)	No (0)	Yes (2)	Partial (1)	Total Sum: 6 Total Possible Sum: 22 Summary Score: 0.27
75. Porter & Alison (2005)	Yes (2)	Partial (1)	Yes (2)	No (0)	N/A	N/A	N/A	Partial (1)	No (0)	Yes (2)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 6

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															Total Possible Sum: 22 Summary Score: 0.54
76. Pyrooz & Sweeten (2015)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .91
77. Pyrooz (2014)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .91
78. Pyrooz et al. (2012)	Partial (1)	Partial (1)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68
79. Rafael, Fucundo & Pedrao (2008)	Yes (2)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	No (0)	No (0)	No (0)	No (0)	Partial (1)	Partial (1)	Partial (1)	Total Sum: 8 Total Possible Sum: 22 Summary Score: 0.36
80. Rufino et al. (2011)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: .95
81. Ryan, Miller-Loessi & Nieri (2007)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	No (0)	No (0)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22 Summary Score: .72
82. Salaam (2011)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	No (0)	Yes (2)	Yes (2)	No (0)	No (0)	Yes (2)	Partial (1)	Total Sum: 14 Total Possible Sum: 22 Summary Score: .64
83. Sirpal (2002)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	No (0)	Yes (2)	No (0)	No (0)	Partial (1)	Yes (2)	Total Sum: 13 Total Possible Sum: 22

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															Summary Score: .59
84. Tapia (2011)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 21 Total Possible Sum: 22 Summary Score: .95
85. Taylor et al (2008)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	Yes (2)	Partial (1)	Yes (2)	Total Sum: 17 Total Possible Sum: 22 Summary Score: 0.77
86. Taylor et al. (2004)	Partial (1)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	No (0)	Partial (1)	Partial (1)	Yes (2)	Partial (1)	Partial (1)	Total Sum: 11 Total Possible Sum: 22 Summary Score: .50
87. Taylor et al. (2003)	Partial (1)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Total Sum: 15 Total Possible Sum: 22 Summary Score: .68
88. Thompson & Braaten- Antrim	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 20 Total Possible Sum: 22 Summary Score: .90
89. Thornberry et al (1993)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	No (0)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22 Summary Score: 0.73
90. Valdez et al. (2000)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Partial (1)	No (0)	N/A	Yes (2)	No (0)	Partial (1)	Total Sum: 13 Total Possible Sum: 20 Summary Score: .65
91. Valdez et al. (2006)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Yes (2)	Partial (1)	Yes (2)	Yes (2)	No (0)	Yes (2)	Partial (1)	Total Sum: 17 Total Possible Sum: 22 Summary Score: .77

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92. Vasquez et al (2012)	Yes (2)	Partial (1)	Partial (1)	Partial (1)	N/A	N/A	N/A	Partial (1)	Partial (1)	Yes (2)	No (0)	Yes (2)	Yes (2)	Partial (1)	Total Sum: 13 Total Possible Sum: 20 Summary Score: .65
93. Volkmann et al. (2013)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
94. Walker-Barnes & Mason (2001)	Yes (2)	Yes (2)	Partial (1)	Partial (1)	N/A	N/A	N/A	Yes (2)	Partial (1)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
95. Wang (1994)	Yes (2)	Partial (1)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	Partial (1)	Partial (1)	Partial (1)	No (0)	Partial (1)	Yes (2)	Total Sum: 11 Total Possible Sum: 22 Summary Score: .50
96. Webb et al (2006)	Partial (1)	Yes (2)	Partial (1)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
97. Weerman, Lovegrove & Thornberry (2015)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 18 Total Possible Sum: 22 Summary Score: .82
98. White & Mason (2006)	Yes (2)	Partial (1)	Partial (1)	No (0)	N/A	N/A	N/A	Partial (1)	Yes (2)	Partial (1)	No (0)	No (0)	Partial (1)	Partial (1)	Total Sum: 10 Total Possible Sum: 22 Summary Score: 0.45
99. Winfree Jr. et al. (2001)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	Yes (2)	Partial (1)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86

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100. Wood et al. (2009)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Yes (2)	Partial (1)	Yes (2)	Partial (1)	Yes (2)	Yes (2)	Partial (1)	Total Sum: 19 Total Possible Sum: 22 Summary Score: .86
101. Yoder et al (2003)	Partial (1)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	N/A	Partial (1)	Yes (2)	Yes (2)	No (0)	Partial (1)	Yes (2)	Yes (2)	Total Sum: 16 Total Possible Sum: 22 Summary Score: 0.72
102. Zhang et al (1999)	Yes (2)	Yes (2)	Yes (2)	Partial (1)	N/A	N/A	N/A	Partial (1)	No (0)	Partial (1)	No (0)	No (0)	No (0)	Yes (2)	Total Sum: 11 Total Possible Sum: 22 Summary Score: 0.5

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Number	Paper code	Author(s), year of publication, study location	General overview	Study populations	Aims of the study	Methodology	Findings
1.	C5	Alleyne & Wood (2010)	Gang involvement: psychological and behavioural characteristics of gang members, peripheral youth and non-gang youth	N=798 London based 12-18 year old young people, mean age 14.3 years	An examination of gang members, peripheral youth and non-gang youth across measures of criminal activity, their perception of importance of status, their levels of moral disengagement, their perceptions of out-group threat and their attitudes toward authority.	Quantitative Cross-sectional Gang membership: questions designed for research based on Euro-gang definition	Gang members were more anti-authority than non-gang, and both gang and peripheral youth valued social status more than non-gang youth. Gang members were also more likely to blame their victims for their actions and use euphemisms to sanitise their behaviour than non-gang youth to displace responsibility
2.	C4	Alleyne & Wood (2011)	Gang Involvement: Social and Environmental Factors	Participants from across 5 London schools (gang and non-gang) N=798	This study examines some of the individual, social and environmental factors that differentiate gang-involved youth from non-gang youth in a British setting.	Quantitative Cross-sectional design Gang affiliation measure: Single-item self-report combined with Eurogang definition	Most significant risks were: parental management, deviant peer pressure, and commitment to school. Ethnicity and gender were not significant (showing a gender change in risk of gang affiliation). Ethnicity was representative of community demographics.
3.	C4	Alleyne & Wood (2013)	Gang-related crime: the social, psychological and behavioural correlates	N=798 London based 12-18 year old young people, mean age 14.3 years	Thus study examined the behavioural, social and psychological factors associated with gang-related crime.	Quantitative Cross-sectional Gang membership: questions designed for research based on Euro-gang definition	Gangs map out their territory with graffiti and intimidate others via threats. High levels of individual delinquency and the presence of neighbourhood gangs were significant predictors of gang-related crime. The perceived importance of social status, moral disengagement and anti-authority attitudes did not predict gang-related crime. Perceived importance of social status and high levels of moral disengagement predicted gang-related crime with anti-authority attitudes acting as a mediator.
4.	C6	Ang, Huan, Chua & Lim (2012)	Gang affiliation, aggressive, and violent offending in a sample of youth offenders	Case files of n=390 youth offenders between 16-18 years of age from Singapore.	Gang affiliation, aggression and violent offending were examined in case files of 390 offenders aged between 16-18 years.	Quantitative Cross-sectional Measures: none described	Young offenders who were gang members and those who were not gang members but exposed to friends in gangs had a significantly higher likelihood of violent offending compared with a reference group of youth offenders who had neither gang-affiliation nor friends in gangs. Non-gang affiliated youth with friends in gangs had a lower likelihood of violent offending than young offenders who were gang members.
5.	C5	Aryan, Jandial, Bennett, Masri, Lavine & Levy (2005)	Gunshot wounds to the head: Gang- and non-gang-related injuries and outcomes	N=349 gang and non-gang youth in LA	This study examined the differences between gang and non-gang-related incidents of penetrative missile injuries in	Quantitative Case-control study exploring retrospective and	Gang-related shooting slightly outnumbered non-gang-related incidents. Demographic analysis showed both a male and Hispanic predominance for both gang-

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					terms of demographics, motivation, intra-cranial pathology, transit time, injury time and clinical outcome.	prospective chart review Gang measure: no reporting of any measure to determine gang membership	and non-gang-related victims and significant differences in gender, race and age. Occipital entrance sites were more common in the gang-related vs temporal entrance sites in the non-gang-related. Mean transit time to the emergency department for gang-related shootings was less than non-gang-related shootings (24.4 vs 27.8 minutes). Most shooting incidents took place between 6 pm and 3 am. No difference between survival and outcome was noted between gang and non-gang victims.
6.	C2	Barnes, Beaver & Miller (2010)	Estimating the effect of gang membership on nonviolent and violent delinquency: A counterfactual analysis	Pre-existing data from the National Longitudinal Study of Adolescent Health (N= 478 gang members and N=478 non-gang members).	This study reconsiders the well-known link between gang membership and criminal involvement.	Quantitative cohort design utilising longitudinal data Gang affiliation measure: Self report in response to researcher single item question (recruitment into a gang in past 12 months)	While gang membership is a function of self-selection, selection effects alone do not account for the greater involvement in delinquency exhibited by gang members. Gang members maintained a greater involvement in both nonviolent and violent delinquency when measured cross-sectionally, but only violent delinquency when measured longitudinally.
7.	C2	Barnes, Boutwell, Fox (2012)	The effect of gang membership on victimization: A behavioural genetic explanation	Using data drawn from the National Longitudinal Study of Adolescent Health	The current study represents the first attempt to examine how genetic and environmental factors work in concert to influence gang membership, victimization, and the effect of gang membership on victimization experiences.	Quantitative Longitudinal Cohort study Gang measure: self-report – critiqued due to difficulties determining present from past gang membership	The findings indicate that gang affiliation is influenced significantly by both genetic factors and environmental factors that are uniquely experienced by the individual. Controlling for heritable influences, gang membership increased the risk of victimization over time. The latter finding suggests that gang membership operates as a non shared environmental influence on victimization.
8.	C5	Baskin, Quintana & Slaten (2014)	Family belongingness, gang Friendships and Psychological Distress in Adolescent Achievement	N=310 7th graders from Florida	An investigation of connections among social, psychological, and academic functioning of ethnically diverse urban youth.	Quantitative Cross-sectional Gang-affiliation measure: unreported	Youth with lower levels of distress will be more able to benefit from positive family belongingness supporting their academic achievement, whereas those with higher levels of distress will be less able to benefit from the same support. With higher distress, the negative impact of gang friendship is more strongly related to academic outcomes. Interventions on psychological distress may reduce the negative effects of gang friendship.
9.	C1	Beaver, DeLisi, Vaughn & Barnes (2009)	Monoamine oxidase A genotype association	Data from the National Longitudinal Study of Adolescent health	An exploration of genetics of gang involvement and weapon use	Quantitative	Male carriers of low MAOA activity alleles are at risk for becoming a gang member

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			with gang membership and weapon use	(1155 females and 1041 males)		Cohort study Longitudinal and predictive Measures: gang self-report	and, once a gang member, are at risk for using weapons in a fight.
10.	C6	Bennett & Holloway (2004)	Gang membership, drugs and crime in the UK	N=2,666 gang and non-gang members (17-30 years of age) from the New English and Welsh Arrestee Drug Abuse Monitoring programme	The paper reports findings generated from the New English and Welsh Arrestee Drug Abuse Monitoring programme on gang membership and its relation to crime and drug misuse.	Quantitative Cross-sectional Measures: self report for gang membership based on questions of affiliation and belonging to a gang	The paper concludes that the UK may be entering a new phase in the development of street crime among young people and argues that it is important to monitor this development for the purpose of policy and fundamental knowledge.
11.	C6	Biswas, Olate & Vaughn (2011)	Cross-national study of risky sexual behaviour among gang-involved youth in metropolitan Boston and San Salvador, El Salvador	Gang involved youth from Boston (n = 375) and San Salvador (n = 207)	A comparison between gang-involved and non gang-involved youth on key characteristics and assessed factors associated with risky sexual behaviours	Quantitative Cross-sectional using secondary data from cross sectional survey Measure of gang affiliation: self-report to two items asked by researcher	Medium to large effect-size differences were noted in future orientation, delinquency and gang-involvement attitudes. Gang-involvement and risky sexual behaviour were associated in this sample. Salvadoran youth differed significantly from those in Boston on key gang-related characteristics, rendering them even more vulnerable.
12.	C7	Bjerregaard (2002)	Self-definitions of gang membership and involvement in delinquent activities.	Pre-existing data from 1985: N= 1,663 men and women from 10 inner-city high schools in the U.S.	This research examines the construct validity of gang membership by examining the relationship between various methods of operationalizing gang membership and delinquent involvement.	Quantitative Cross-sectional design Gang-affiliation: self-report on two items by researcher	Individuals reporting membership in organized gangs were far more likely to report that their gangs possess the characteristics typically associated with traditional street gangs. Likewise, the respondent's self-identification had a strong impact on both the group's and the individual's criminal behaviour. Overwhelmingly, persons who considered themselves to be members of an organized gang were more apt to engage in all types of delinquent activities.
13.	C2	Bjerregaard (2010)	Gang membership and drug involvement: Untangling the complex relationship	National Longitudinal Survey of Youth 1997 (NLSY97; U.S. Bureau of Labor Statistics, 1997). The data used for this research include the 1997, 1998, and 1999 survey years when respondents were an average age of 14, 15, and 16 years, respectively.	This research attempts to establish the temporal ordering of these relationships while controlling for a variety of relevant variables and to determine whether the relationships between drug involvement and violence differ for gang members versus non gang members.	Quantitative Cohort study utilising longitudinal data Gang measure: self-report response to researcher questions	The findings indicate that gang membership is weakly associated with drug involvement, including both usage and sales. This involvement, however, does not appear to be related to assaults. Results suggest that gang membership is not determinative of drug involvement among a national random sample of youth.

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14.	C4	Bradshaw, Wasdorp, Goldweber & Johnson (2012)	Bullies, gangs, drugs, and school: Understanding the overlap and the role of ethnicity and urbanicity	N= 16,302 adolescents (50.3 % female, 62.2 % Caucasian, 37.8 % African American) enrolled in 52 US high schools.	The current study examined different subtypes of involvement in bullying—as primarily a victim, as primarily a bully, as both a victim and bully, and no involvement	Quantitative Cross-sectional design Gang affiliation measure: single item self-report question	Bullies and bully/victims were generally at greatest of risk of being involved in violence, engaging in multiple types of substance use, and having academic problems.
15.	C7	Brooks, Lee, Stover (2011)	HIV testing, perceived vulnerability and correlates of HIV sexual risk behaviours of Latino and African American young male gang members.	Data were collected from 249 gang members ages 18–26 years old (Latino and African American men) living in Los Angeles, California	This study examined HIV testing behaviours, perceived vulnerability to HIV, and correlates of sexual risk behaviours of young adult Latino and African American male gang members in Los Angeles, California.	Quantitative Cross-sectional design Gang Measure: unreported	The majority (59%) of gang members reported unprotected vaginal intercourse (UVI) in the past 12 months. Only one-third (33.2%) of gang members had ever been tested for HIV.
16.	C4	Brownfield (2003)	Differential Association and Gang Membership.	Pre-existing data (n=543) high school students in Canada	An exploration of differential association and gang membership and gang membership.	Quantitative cross sectional design Gang membership measure: Single item self report	Definitions favourable to law violations are significantly related to gang membership. Parental attachment is not a significant correlate of gang membership.
17.	C6	Brownfield (2012)	Gender and gang membership: Testing theories to account for different rates of participation.	Previously gathered data on N=521 Canadian participants	This paper explores the factors affecting gender differences in gang affiliation.	Quantitative Cross-sectional Gang affiliation: based on self –report associated factors (such as peer delinquency)	There is no significant difference between gender and gang relationship. Differential association and social control theory processes such as attachment and acquisition if deviant definitions at the individual level seem to mediate gender differences.
18.	C7	Brownfield & Thompson (2002)	Distinguishing the effects of peer delinquency and gang membership on self-reported delinquency.	Data taken from Seattle Youth Study / National Crime Survey (NCS) for 1973-1977 Unclear-cites Heindelang, 1981	An examination of the distinction between peer delinquency and gang membership.	Quantitative Cross-sectional Gang membership measured by: Single item self-report	Gang membership, peer delinquency, and self-reported delinquency do not form a single underlying variable or construct..
19.	C5	Brownfield, Sorenson & Thompson (2001)	Gang membership, race, and social class	Data from the Seattle Youth Study N=?	This article examines the extent to which gang membership, race, and social class affect a youth's chances of being arrested, independent of their self-reported behaviour.	Quantitative Cross-sectional Gang measure: subjective and self-report (would you be in what other people might call a gang?)	The odds of being arrested are roughly similar for gang and non-gang members, controlling for the nature and level of self-reported delinquency. Race and social class are more associated with risk of arrest. Being black and lower class specifically increases a youth's odds of being arrested independent of delinquency.
20.	C6	Cadwallader & Cairns (2002)	Developmental influences and gang awareness among African-American inner city youth.	Participants (n = 489) were African American boys and girls from the 1st, 4th, and 7th	This research aimed to clarify the correlates of gang awareness in inner city youth as a function of age, gender	Quantitative Cross-sectional design Gang affiliation measures: self-report	Girls' and boys' familiarity with local gangs increased with age and differed by peer group affiliation. The relationship of gang familiarity to teacher and self-ratings of aggression, popularity, and academic

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				grades in four inner city public schools.	and peer group affiliation. It is proposed that the influence and hegemony of street gangs is a distinguishing feature of inner city neighbourhoods, and that this influence is mediated by development.	based on frequency of report of gang names plus The Social Cognitive Interview, Interpersonal Competence Scale, Social Cognitive Interview and Social Cognitive Map (SCM) procedure-note this is for awareness not affiliation	competence changed with age. These findings support the proposition that neighbourhoods have nontrivial effects on social development, and these effects are likely to interact with developmental status and social affiliations.
21.	C6	Cartwright, Howard & Reuterman (1970)	Multivariate analysis of gang delinquency: III. Age and physique of gangs and clubs.	N=238 11-24 year olds (Colorado)	Gang members and comparison group are tested across different personality factors to assess which factors applied more to gang affiliated youth.	Quantitative Cross-sectional design Gang affiliation measure: Self-report (unclear)	Control group were more exuberant, realistic and assertive than gang members. Gang members showed more manic smartness, less self-realisation and there was no linear relationship overall between personality factors and gang affiliation.
22.	C6	Chu, Daffern, Thomas & Lim (2011)	Elucidating the treatment needs of gang-affiliated youth offenders.	N=165 gang and non gang-affiliated young offenders 12-18 year olds from Singapore	The study sought to elucidate the criminologic needs of gang and non gang-affiliated youth	Quantitative Case-control study with retrospective reporting Gang measures: self-report and criminal records	Results demonstrate that gang and non-gang affiliated young offenders had similar criminogenic need profiles except for in regard to peer delinquency
23.	C4	Coid, Ullrich, Keers, Bebbington, Destalova, Kallis, Yang, Reis, Jenkins & Donnelly, (2013)	Gang membership, violence and psychiatric morbidity	N=4, n=664 men of 18-34 years of age in GB (over half of whom were gang involved and from areas of high violence	An investigation of associations between gang-membership, violent behaviour, psychiatric morbidity, and use of mental health services	Quantitative Cross-sectional Gang membership measured by: self-report of current gang membership based on items identified with gang membership	Gang members show inordinately high levels of psychiatric morbidity, placing a heavy burden on mental health services. Traumatization and fear of further violence, exceptionally prevalent in gang members, are associated with service use. Gang membership should be routinely assessed in individuals presenting to health care services in areas with high levels of violence and gang activity. Health care professionals may have an important role in promoting desistance from gang activity.
24.	C6	Corcoran, Washington & Meyers (2005)	The Impact of Gang Membership on Mental Health Symptoms, Behaviour Problems and Antisocial Criminality of Incarcerated Young Men.	N= 73 incarcerated young men in Oregon	This study examines whether gang members differ from nongang members on mental health symptoms, behaviour problems, and antisocial criminality	Quantitative Cross-sectional Gang affiliation measure: unclear	Gang members report more mental health symptoms, more external behaviour problems including delinquency and self-destructiveness and thought problems than non-gang members. Gang members also reported more antisocial criminality 12 months prior to incarceration. When mental health symptoms were statistically controlled, gang members were indistinguishable from non-gang members on all variables except for antisocial

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							behaviours. Taken together, these results suggest the importance of mental health services in a release plan
25.	C3	Craig, Vitaro, Gagnon, Tremblay (2002)	The road to gang membership: Characteristics of male gang and non-gang members from ages 10 to 14.	N=142 gang and non gang affiliated boys who had a complete data set at ages 11, 12, 13, and 14(Quebec).	This study examined the stability of belonging to a gang in early adolescence, the behaviour profiles, family characteristics, and friendships of non gang and gang members.	Quantitative Cohort study design utilising longitudinal data Gang affiliation measure: unclear	Stable gang members had significantly higher scores than non-gang members on teacher ratings of fighting behaviour, hyperactivity, inattention and oppositional behaviour, and self-reported delinquent activities (drug and alcohol use, stealing and vandalism). Peers rated gang members as more aggressive than non-gang members.
26.	C6	Curry & Spergal (1992)	Gang involvement and delinquency among Hispanic and African-American adolescent males.	N=139 Hispanic and n=300 African American males 6 th -8 th form in Chicago (gang and non-gang affiliation).	An investigation into the relationship between gang-involvement and delinquency.	Quantitative Rasch modelling Cross sectional Gang affiliation measured by: self-report survey and police intelligence	Gang involvement is an effective indicator of delinquency for these youth, but the reverse is not true.
27.	C6	Danyko, Arlia & Martinez (2002)	Historical risk factors associated with gang affiliation in a residential treatment facility: A case/control study.	N=61 (31 male, 30 female) US residents were studied. The age range of the subjects in the study was 12 to 19 years	The objective of the present study was to investigate differences between gang and non-gang affiliated adolescents who reside in residential treatment.	Quantitative Case-control design Gang affiliation measure: based on five indicators designed by researchers	Historical data from the subjects charts revealed significant differences between the two groups in terms of foster care placement early in life, substance abuse history, mother's substance abuse history, history of abuse, and psychological diagnosis. In line with hypothesis 2, the gang-involved group had a history of at least one identified form of abuse and, possibly related, they were more likely to have a diagnostic history of Post Traumatic Stress Disorder (PTSD)
28.	C2	DeLisi, Barnes Beaver & Gibson (2009)	Delinquent gangs and adolescent victimization revisited: A propensity score matching approach	Data for this study were drawn from the National Longitudinal Study of Adolescent Health (n = 15,197)	The current study used propensity score matching (PSM) to evaluate the effects of gang membership on victimization at two time points using data from the National Longitudinal Study of Adolescent Health.	Quantitative Cohort study design utilising longitudinal data Gang membership measure: single item self-report question posed by researcher	The most antisocial youths and those with more delinquency victimization were more likely to join gangs, which supports the selection model. In support of the enhancement model, the authors found that after controlling for selection effects using PSM, gang membership maintained a significant predictive relationship with victimization measured contemporaneously and longitudinally. Membership in a gang increases youths' chances of being victimized above and beyond personal characteristics, and the deleterious gang effect does not weaken over time.

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29.	C5	DeLisi, Spruill, Vaughn & Trulson (2013)	Do gang members commit abnormal homicide?	Pre-existing data (N=618) male convicted and incarcerated homicide offenders spanning the Midwestern, Southern, and Atlantic coast areas of the United States.	The current study empirically examined gang status and diverse forms of homicide perpetration.	Quantitative Cross-sectional Gang affiliation measure: criminal record/ tattoos	Gang-involved offenders were nearly three times as likely to commit a normal homicide. However, gang members were 64 % less likely to perpetrate multiple-victim murder. Gang status reduced the likelihood of sexual homicide by 75 % and reduced the likelihood of abduction homicide by 56 %. These findings present an anomaly in the gang-homicide literature.
30.	C2	Dishion, Nelson & Yasui (2005)	Predicting Early Adolescent Gang Involvement From Middle School Adaptation.	The sample consisted of 714 European American (EA) and African American (AA) boys and girls.	This study examined the role of adaptation in the first year of middle school (Grade 6, age 11) to affiliation with gangs by the last year of middle school (Grade 8, age 13).	Quantitative Cohort (utilising longitudinal data) Gang-affiliation measure: Five indices and multiple perspectives (eg peer/ school counsellor)	Unexpectedly, self-report measures of gang involvement did not correlate highly with peer and school staff reports. Findings also suggest that the youth level of problem behaviour and the school ecology (e.g., peer rejection, school failure) require attention in the design of interventions to prevent the formation of gangs among high-risk young adolescents.
31.	C1	Dmitrieva, Steinberg, Piquero & Fagan (2014)	Predictors and Consequences of Gang Membership: Comparing Gang members, Gang Leaders, and Non-Gang Affiliated Adjudicated Youth	N=1,170 adjudicated youth (US)	The study examined how low self-esteem, psychopathy and psychosocial maturity relate to differing gang membership levels.	Quantitative Cohort study design utilising longitudinal data Gang affiliation measure: three item self-report by researchers	Low temperance, perspective and responsibility predicted low-level gang membership. Low self-esteem predicted gang membership at a younger age and low-level gang membership. High self-esteem and grandiose-manipulation traits alongside lower temperance predicted gang leadership during early adulthood. Psychopathic traits increased across both groups over time.
32.	C7	Dukes, Martinez & Stein (1997)	Precursors and consequences of membership in youth gangs.	N=11,000 secondary school students from Colorado	An exploration in to the factors leading to gang membership from selection and facilitation models.	Quantitative Cross-sectional design Gang affiliation: single item self-report for membership alongside single item self-report if degree of affiliation	Low self-esteem, perceived academic ability, psychosocial health and bonds with institutions appeared to precede gang membership. Greater drug use, delinquency, fear of harm and being armed were both precursors and consequences of gang membership. Lack of social integration was an important mediator of gang affiliation.
33.	C2	Dupéré, Lacourse, Willms, Vitaro & Tremblay (2007)	Affiliation to youth gangs during adolescence: The interaction between childhood psychopathic tendencies and neighbourhood disadvantage.	N= 3,522 adolescents from a nationally representative, prospective sample of Canadian youth.	An exploration into whether a combination of individual propensity and facilitating neighbourhood conditions amplifies the probabilities of youth gang affiliation.	Quantitative Cohort study design utilising longitudinal data Gang affiliation measure: single item self-report	Neighbourhood residential instability, but not neighbourhood concentrated economic disadvantage, interacted with individual propensity to predict youth gang membership. Adolescents with pre-existing psychopathic tendencies appeared especially vulnerable, mainly if they were raised in residentially unstable neighbourhoods.
34.	C5	Egan & Beadman (2011)	Personality and gang embeddedness.	N= 152 remand and sentenced	Constructs derived from a variety of personality measures	Quantitative Cross-sectional design	Path analysis showed the antisocial personality dimension predicted previous

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				participants; incarcerated within a general prison in London, UK who indicated their gang embeddedness as youths, prior to custody, within prison, and as an intent following release.	and constructs were used to predict overall reported gang embeddedness.	Gang affiliation measure: Four question self report scale devised by the researchers	convictions and degree of gang embeddedness, whereas resilience did not. The direct and indirect effects of the composite antisocial personality dimension explained 50% of the overall observed variance in gang embeddedness. We suggest that gang membership may reflect normal assortative processes within the members of such groups.
35.	C2	Eitle, Gunkel & van Gundy (2004)	Risk factors predicting gang membership	Prospective and retrospective data of N=1, 286 South Florida boys	Examination of risk factors that predict gang membership among a cohort of South Florida boys.	Quantitative Prospective longitudinal study Cohort study Measured gang affiliation and gang association by self report, and design of four questions, in addition, gang involvement was calculated by constructed self report questions Other measures were based on adaptation of other models or questioning by researcher.	The association between cumulative stress exposure was mediated by race, family, financial problems and preteen cumulative exposure to stressful life events which were all seen to predict association / behaviour and involvement with gangs.
36.	C2	Esbensen & Carson (2012)	Who are the gangsters?: An examination of the age, race/ethnicity, sex, and immigration status of self-reported gang members in a seven-city study of American youth.	N= 31 schools in 7 US cities data collected as part of the second National Evaluation of the Gang Resistance Education and Training (G.R.E.A.T.)	The current article replicates Esbensen and Winfree's research by examining the sex and racial/ethnic characteristics of self-reported gang members in a seven city study. It also looks at other differentiating factors between gang and non-gang.	Quantitative Longitudinal Cohort study Measures for gang affiliation: based on self-nomination	Ethnicity did not seem significant over time. Immigrant status was not a predictor. As Esbensen and colleagues (2010, p. 86) concluded, "Gang membership appears to provide an equal opportunity for all."
37.	C5	Esbensen, Deschenes & Winfree (1999)	Differences between Gang Girls and Gang Boys; Results from a multi-site survey	5.935 8 th grade students (U.S.)	To explore differences in male and female gang membership.	Mixed methods but scored as quantitative Cross-sectional analysis Gang membership measure: two self-report questions as put forward by researcher	Gang affiliated girls reported more social isolation and lower self-esteem than gang-affiliated boys. More girls were gang affiliated than anticipated

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38.	C5	Esbensen, Peterson, Taylor & Freng (2009)	Similarities and differences in risk factors for violent offending and gang membership.	5,395 8th grade students in 11 cities across the United States	In this article the authors explore the effects of cumulative risk, including risk in multiple domains, on youth violence and gang membership and to what extent the patterns are similar or different for youth violence and gang membership. They additionally investigate the extent to which risk factors exert independent effects when other factors are controlled in multivariate analyses, and whether the risk factors for youth violence similar to or different from those for gang membership?	Quantitative Cross-sectional design Measure for gang affiliation: self-report two item question asked by researcher	<p>A key 'tipping point' is found at seven risk factors; that is, the odds of engaging in either violence or gang membership are twice as great for youths with seven compared with six risk factors; other tipping points are found at 12 and 14 risk factors, respectively, for violence and gang involvement. Possessing risk factors in multiple, as opposed to no or just one domain, also dramatically increases odds of involvement in both forms of violence, although, again, more so for violence than for gang membership.</p> <p>Peer factors appear to be particularly important, with five of six increasing odds of violence and three increasing odds of gang involvement.</p> <p>Unique predictors of serious violence — or, those factors that are predictive only of violence but not of gang membership — are impulsivity, risk-seeking tendencies, few conventional peers, and unsupervised, unstructured socialising with peers. Consistent with other research (e.g., Hill et al., 1999; see also Klein & Maxson, 2006).</p> <p>Risk factors associated with gang membership are the same as those for violent offending. It is the accumulation of these risk factors that leads youths to become gang involved: our analyses demonstrate that a greater number of risk factors is required to achieve the same odds of gang membership as of violent offending; that is, it takes a greater push for youths to become gang-involved than violence-involved.</p>
39.	C5	Estrada, Gilreath, Astor & Benbenishty (2013)	Gang membership of California middle school students: Behaviours and attitudes as mediators of school violence.	The dataset was collected in the 2005–2006 and 2006–2007 academic school years using the ongoing large-scale California Healthy Kids Survey conducted by West Ed for the State of	This study utilizes a state-wide representative sample of Latino, Black and White seventh graders from California to examine a theoretical model of how school risk (e.g. truancy, school substance use and risky peer approval) and protective (e.g. connectedness, support and	Quantitative Cross-sectional design Gang measure: single item self-report	<p>The findings indicate that school risk behaviours and attitudes mediate the association between gang membership and school violence behaviours. Although the direct negative association between gang membership and school violence perpetration is weak, the positive indirect effect mediated by school risks behaviours and attitudes is strong.</p>

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				California (N=272, 836 high school students in California).	safety) behaviours and attitudes mediate the effects of gang membership on school violence behaviours.		This indicates that when gang members engage in school risk behaviours, they are much more likely to be school violence perpetrators.
40.	C6	Evans, Albans, Macari & Mason (1996)	Suicide ideation, attempts and abuse among incarcerated gang and non-gang delinquents.	N=334 males and N=61 females incarcerated in Nevada. Half were gang members and other half were non gang members.	Exploration of the links between gang affiliation, abuse and suicidal ideation.	Quantitative Cross-sectional (case-control) Gang affiliation measure: Three item self-report by researchers	Gang members reported less suicidal ideation & attempted suicide than non gang members but this increased if they had been exposed to sexual abuse.
41.	C2	Evans, Fitzgerald, Weigel & Chvilicek (1999)	Are rural gang members similar to their urban peers? Implications for rural communities	2,183 7 th -12 th grade Nevada students	To explore whether there were differences between rural and urban students in regard to gang affiliation.	Quantitative Longitudinal data and uses an ecological analytic model Cohort study Measures: self report gang membership	No differences between pressure to join gangs. Urban students significantly more likely to report having peers in gangs, being threatened by gangs and had significantly heightened concerns for personal safety.
42.	C7	Facundo, F. R. G., & Pedrão, L. J. (2008)	Personal and interpersonal risk factors in the consumption of illicit drugs by marginal adolescents and young people from juvenile gangs	175 marginal adolescents who belong to juvenile gangs in Mexico.	Analysis of the effect of personal and interpersonal risk factors of drug consumption in young people who belong to juvenile gangs in Mexico.	Quantitative Descriptive correlational study Measures: not gang specific measures but general self-report	Personal factors strongly relate to drug use. Highest correlating factors were gender, age and mental health problems. Interpersonal factors, such as relationships with delinquent peers and inappropriate relationships with parents, also showed an effect, albeit slightly weaker
43.	C5	Farmer & Hairston (2013)	Predictors of gang membership: variations across grade level	A secondary data analysis of N=19,079 US students	An examination of the predictors of gang membership for adolescents in Grades 6-12.	Quantitative Cross-sectional design Gang affiliation measures: self-report despite critique within paper as reliant on secondary data	6 th -8 th graders had the most risk factors 9 th -12 th graders had the least risk factors Individual-level risk factors were most prevalent and some of these were consistent across grade level - being male, having a parent or close family member die within the last year. Being suspended from school, having low self-esteem, receiving free lunch, being rejected by peers, perceiving neighbourhood as unsafe, and having to repeat a grade.

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44.	C6	Florian-Lacy, Jefferson & Fleming (2002)	The relationship of gang membership to self-esteem, family relations, and learning disabilities.	The population consisted of 205 high school students between the ages of 14 to 19, in Southeast Texas (gang and non-gang affiliated).	An investigation to learn more about the social and personal disabilities of individuals with differing levels of gang membership,	Quantitative Cross-sectional Gang affiliation measure: Gang Membership Inventory (GMI)	The results indicated that youths with high gang membership exhibited: (1) significantly lower self-esteem scores; (2) significantly lower family relationship scores; but (3) no increased incidence of learning disabilities.
45.	C6	Freng, Davis, McCord & Roussell (2012)	The New American Gang: Gangs, in Indian Country	N=106 6 th -12 th graders from an American Indian reservation.	An overview of the characteristics of American Indian gang members and gangs from a Western American Indian reservation community and risk factors that differentiate those in gangs in tribal communities from those not in gangs in tribal communities.	Quantitative Current self report (t-test comparison between gang and non-gang). Gang membership measures: self report	Gang and non-gang members did not differ on cultural identity levels, or social isolation. Non gang members demonstrated higher guilt levels. Gang members reported significantly less parental monitoring and higher levels of perceived parental deviance.
46.	C5	Friedman, Mann & Friedman (1975)	A profile of juvenile street gang members.	N=536 15-18 year olds gang and non-gang affiliated	This study was designed to generate a profile of Philadelphia gang-affiliated youth	Quantitative Cross sectional Gang affiliation measure: self-report based on researcher devised questionnaire	High proclivity to violence was the most predictive factor. Companionship, excitement, heterosexual contact and protection were cited as the next risk areas as benefits seen of gag membership by the group. Defiance of parents was next most significant, and attacks (verbal and physical against parents was high-mostly aimed at fathers). Parental defiance was highly associated with premeditated violence and aggression. Gang membership enhances self-esteem (anti-hero) and poor mother-son relationships were noted. Lower socioeconomic status was a risk and gang membership was seen as a way to get needs met and engage in activities. Gang members additionally had more unrealistic expectations of success, but less opportunity to be successful through traditional means.
47.	C2	Gatti, Tremblay, Vitaro & McDuff (2005)	Youth gangs, delinquency and drug use: a test of the selection, facilitation, and enhancement hypotheses	N=756 boys Kindergarten-17 years of age, from disadvantaged areas of Montreal	An attempt to investigate the validity of various hypotheses in relation to models of gang membership.	Quantitative Cross-sectional design utilising longitudinal data for correlation analysis)	Gang members displayed far higher rates of delinquent behaviour and drug use than non-gang members. The results support the facilitation model for transient gang and the enhancement model for stable gang members for person and property offences. The association between gang membership and delinquency persisted after introducing

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						Gang affiliation measure: single item self report	the control variables. Additional analyses showed that the effect associated with belonging to a gang was beyond that of simply having delinquent friends.
48.	C1	Gilman, Hill, Hawkins, Howell & Kosterman (2014)	The Development Dynamics of Joining a Gang in Adolescence: Patterns and Predictors of Gang Membership	Seattle Social Development Project (n=808)	The study examines predictors of joining a gang, tests effects of these on age and whether this differs by gender.	Quantitative Cohort study from longitudinal data Gang affiliation measure: Single-item self-report	Risks include: living with a gang member, living in an anti-social neighbourhood, and recent anti-social peer influence.
49.	C5	Griffin & Hepburn (2006)	The effect on gang affiliation on violent misconduct among inmates during the early years of confinement	N=2, 158 male inmates confined to a south-western state prison system for at least three years	Exploration of the predictors of violent misconduct in the first few months and the effects of gang affiliation in this relationship.	Quantitative Cross sectional analysis Gang membership measured by: police intelligence	Gang affiliation has an effect on violent misconduct among inmates beyond the individual risk factors generally attributed to youth and prior criminal history.
50.	C6	Harper, Davidson & Hosek (2008)	Influence of gang membership on negative affect, substance use, and antisocial behaviour among homeless African American male youth	N=69 homeless African American young men were recruited from community agencies	The current study examined differences between gang-involved and non-gang-involved homeless African American male youth with regard to negative affect, substance use, and antisocial/violent behaviour.	Quantitative Case-control Gang measure: questionnaire designed as part of research	Overall, gang members reported higher rates of negative mental and physical health outcomes than did non-gang members, with current gang members reporting higher levels of depression and anxiety, greater levels of antisocial and violent behaviour, and higher levels of lifetime alcohol and marijuana use. Greater levels of gang involvement were associated with more frequent lifetime use of alcohol and marijuana and higher levels of participation in violent behaviours.
51.	C5	Hermann, McWhirter & Sipsas-Herrmann (1997)	The relationship between dimensional self-concept and juvenile gang involvement: Implications for prevention, intervention, and court referred diversion programs.	N=427 fifth-, sixth- and eighth grade students from a south western US neighbourhood.	In this investigation we assessed 427 youths from an area with considerable gang activity to determine the way in which self-concept is related to gang involvement, and to assess how gang involvement fluctuates as a function of gender and grade level.	Quantitative Cross-sectional design Gang affiliation measure: Gang membership inventory used (and cited)	Males were found to be significantly more gang involved than females, but no differences were found by grade level (although a significant gender by grade interaction was present).
52.	C3	Hill, Howell, Hawkins & Battin-Pearson (1999)	Childhood risk factors for adolescent gang membership	Longitudinal data from the Seattle Social Development Project (n=808) 10-18 year old, ethnically diverse gender balanced sample.	Detailed examination of risk for gang membership in 10-12 year olds	Quantitative Longitudinal and predictive Cohort study	Neighbourhood, family, school, peer, and individual factors significantly predicted joining a gang in adolescence and youths exposed to multiple risk factors were much more likely to join a gang.

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						Measures: gang self-report	
53.	C5	Hope & Damphousse (2002)	Applying self-control theory to gang membership in a non-urban setting.	N=1,139 junior high and high school students	A exploration of the characteristics of gang members and the relationship between gang membership and delinquency using self-control theory	Quantitative Cross-sectional Gang membership measure: single self-report item	Gang members are more likely to be non-white, lower social class, male, from broken homes, and more involved in delinquent behaviour. Self-control was a strong predictor of gang membership, and appears to be in place prior to gang membership and remaining stable after gang membership.
	C5	Kakar (2005)	Gang membership, delinquent friends and criminal family members: Determining the connections.	N=91 US gang members (18-20 years)	An exploration into the connections between gang membership, familial gang involvement and peer delinquency.	Quantitative Cross-sectional Gang membership: measured by single item question and then follow up specific questions selected by researcher (in line with Klein, 1995)	Gang membership was found to independently affect delinquency beyond the effects of having delinquent friends and criminal family members.
55.	C6	Kakar (2008)	Gang affiliation and negative perceptions about authority, law enforcement, and laws: Is gang affiliation a precursor to becoming a threat to homeland security and terrorism?	N= 201 then split in to three groups (non-gang/ gang affiliated/ gang members) from the Southeaster region of the United States.	This study explored the connections between gang affiliation and negative perceptions about authority, law enforcement, and laws.	Quantitative Cross-sectional design Gang membership measure: Set of self-report questions set by researcher	Gang members had more negative perceptions about authority law enforcement and laws and are more enthusiastic about engaging in illegal activities. They are more likely to justify terrorist acts than non gang-affiliated youth, however, gang membership was not found to independently affect justification for terrorist acts.
56.	C4	Katz, Webb, Fox & Schaffer (2011)	Understanding the relationship between violent victimization and gang membership	N= 909 recently booked juvenile arrestees who were interviewed as part of the Arizona Arrestee Drug Abuse Monitoring (ADAM) program	The current study examines three hypotheses: (1) gang involvement and involvement in other risky lifestyles is related to violent victimization, (2) involvement in gang crime is associated with violent victimization, and (3) the presence of rival gangs is related to violent victimization.	Quantitative Design: cross sectional analysis employing modification of the Poisson based regression model for analysis Gang measure: police intelligence	Our findings indicated that prevalence of violent victimization was highest among gang members, followed by former gang members, gang associates, and non-gang members. After controlling for involvement in gang crime, however, gang membership per se did not significantly influence the juveniles' risk of serious violent victimization.
57.	C5	King, Voisin & DiClemente (2013)	Gang norms and risky sex among adolescents with a history of detention.	N=136 adolescent detainees who reported gang involvement from the U.S.	This paper aimed to explore whether it is not just gang membership but gang norms that are associated with risky sex.	Quantitative Cross sectional Gang affiliation measure: self report to several items outlined by researcher	Results suggest that the norms present within gangs infer added sexual risks.

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58.	C6	Kissner & Pyrooz (2009)	Self-control, differential association and gang membership	N=200 jail inmates housed in a large Californian city	This research extends the literature on the self-control/ gang membership association	Quantitative Cross-sectional Measures for gang affiliation: self-nomination/ reporting to current and/ or former involvement in gangs	The results indicate the insignificance of self-control upon controlling for a series of differential association measures.
59.	C2	Krohn, Ward, Thornberry, Lizotte & Chu (2011)	The cascading effects of adolescent gang involvement across the life course.	Previous data set (N= 1,000) adolescents from 14 to 31 years of age from male participants in the Rochester Youth Development Study	Drawing on the life-course perspective, this study argues that gang involvement will lead to precocious transitions that, in turn, will have adverse consequences on the fulfilment of adulthood roles and statuses in the economic and family spheres. Moreover, problems fulfilling these conventional roles are hypothesized then to lead to sustained involvement in criminal behaviour in adulthood.	Quantitative Cohort study design utilising longitudinal data Gang affiliation measure: Self-report (specific questions unclear)	Gang involvement leads to an increase in the number of precocious transitions experienced that result in both economic hardship and family problems in adulthood. These failures in the economic and family realms, in turn, contribute to involvement in street crime and/or arrest in adulthood.
60.	C5	Lachman, Roman & Cahill (2013)	Youth motivations for gang involvement	Network data from 303 youths self-identifying as group members from Montgomery County and Washington DC	An exploration of whether the difference between delinquent and non-delinquent group members	Quantitative Cross-sectional design Gang affiliation measure: Self-report on three items, then collapsed into a single item	Youths who join a group for instrumental purposes exhibit more delinquent behaviour than those who don't. Youth who join groups for a sense of belonging have a weaker relationship to delinquency. Specific reasons for joining groups could predict levels of delinquency performed by the group.
61.	C1	Lahey, Gordon, Loeber, Stouthamer-Loeber & Farrington (1999)	A prospective study of predictors of first gang entry	N=347 7 th grade boys in an urban public US school (longitudinal data from PYS)	An exploration of the predictors of first entry gang involvement	Quantitative Cohort study Prospective study of first predictors Measures: self report	Among African American boys, first gang entry was predicted by conduct disorder behaviours and these behaviours increasing. During adolescence, having peer involved in gangs added an additional risk of gang membership. Family income and parental supervision also independently predicted gang entry, also the direction of this depended on the youth's age.
62.	C7	Larson & Busse (1998)	Specialist-level preparation in school violence and youth gang intervention.	Ninety specialist-level programs were included in the final study.	An exploration of the hypotheses that programs located in or near metropolitan	Quantitative Cross-sectional design	Results indicated the majority of programs provided substantial intervention training for more traditional behavioural

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					areas are more likely to offer training in school violence and gang interventions.	Gang affiliation measure: Unreported	concerns (e.g., ADHD, conduct problems). Training in school violence prevention and, in particular, youth gang prevention/intervention, were lower priorities for training. The hypothesis was not supported.
63.	C5	Li, Stanton, Pack, Harris, Cottrell & Burns (2002)	Risk and protective factors associated with gang involvement among urban African American adolescents	Data from N=349 urban African American youth (Eastern Metropolis)	An exploration of whether the differences in exposure, resilience and distress symptoms between gang members and non-members resulted from the risk behaviours in which youth participated or from the gang membership itself	Quantitative Retrospective reporting from current members Gang measures: self report based on recent involvement (past week/ month) also	There was evidence that gang membership itself may be associated with increased risk and ill effects on psychological well-being and that strong family involvement and resiliency are protective factors against gang involvement.
64.	C6	Liu & Fung (2005)	Gang Members' Social Network Composition and Psychological Well- Being: Extending Socio-emotional Selectivity Theory to the Study of Gang Involvement.	N=30 gang-affiliated and n=29 non gang-affiliated young people from Hong Kong	This study attempts to explain gang involvement in Hong Kong in light of socio-emotional selectivity theory	Quantitative Case-control Gang-affiliation measure: three part self-report based on gang activity(referenced Klein, 1971)	Gang members reported more limited time perspective and a higher percentage of emotionally close social partners, but among which fewer came from family or friends when compared to non gang-affiliated youth; suggesting the gang serves a social function.
65.	C5	Lurigio, Flexon & Greenleaf (2008)	Antecedents to gang membership: Attachments, beliefs, and street encounters with the police.	N=943 Chicago Public school students	This study explored gang members attitudes to the police, prosocial beliefs, and experiences with the police. It also explored the relationship between fear of the police and gang membership.	Quantitative Cross-sectional correlational study Gang membership measure: single item self report-are you in a gang?	Gang members were less concerned about teachers attitudes, and cutting school, but equally knew stealing was not acceptable. Gang members had more frequently been stopped and searched, were more fearful and had negative beliefs about the police. By being disrespectful and/ or aggressive, police are unwittingly strengthening gang affiliation and moving fringe members closer to the core. Gang attachments increase as perceived police disrespect increases.
66.	C6	Luyt & Foster (2001)	Hegemonic masculine conceptualisation in gang culture	N=316 gang and non gang-affiliated male participants, drawn from secondary schools within Cape Town	This research sought to investigate the relationship between gang processes and differing forms of masculine expression.	Mixed methods quantitative/ qualitative Cross-sectional Gang measure: none apparent/ unclear how they determined this	Participants from areas characterised by high gang activity were found to support hegemonic elements to a significantly greater extent.
67.	C6	Lyon & Hall (1992)	The family relations, peer relations, and criminal activities of Caucasian and	N=131 Caucasian and Hispanic-American male incarcerated men (gang and non-gang affiliated)	This paper explored the difference between gang members and anti-social delinquent youth in regard to	Quantitative Cross-sectional Gang affiliation: criteria from the Country Gang	Gang members demonstrated higher aggressive behaviour, less social maturity and increased drug use.

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			Hispanic-American gang members.		their familial relationships and other risk areas.	Violence Support Unit and self-report	
68.	C6	McDaniel (2012)	Risk and protective factors associated with gang affiliation among high-risk youth and the role for public health	N=4131 youths in grades 7, 9, 11 and 12 in a high-risk urban school in the USA	To identify risk and protective factors to provide more direction for gang violence prevention strategies	Quantitative cross sectional Gang measures: self report	Gang affiliation was positively associated with engaging in any delinquent behaviours, frequent alcohol use, and frequent drug use. However, gang affiliation was negatively associated with moderate levels of parental monitoring and coping skills.
69.	C5	Melde & Esbensen (2011)	Gang membership as a turning point in the life course	N=1,400 youth	Employing a life-course perspective, we propose that gang membership can be conceptualized as a turning point in the lives of youth and is thus associated with changes in emotions, attitudes, and routine activities, which, in turn, increase illegal activity.	Quantitative Prospective data Measures: Self report and some retrospective reporting	Findings suggest that the onset of gang membership is associated with a substantial change in emotions, attitudes, and social controls conducive to delinquency and partially mediate the impact of gang membership on delinquent activity. Desistance from gangs, however, was not associated with similar systematic changes in these constructs, including delinquent involvement.
70.	C2	Melde, Diem & Drake (2012)	Identifying correlates of stable gang membership	Panel data from the national evaluation of the Gang Resistance Education and Training Program using N=140 self-reported gang members in the US	An examination of whether features of youth gangs, the reasons youth provide for joining youth gangs and the respondent's place in the gang, along with involvement in violent behaviours after onset of gang membership are systematically associated with the length of gang careers	Quantitative Prospective and longitudinal Cohort study Gang affiliation measured by: self report (mentions Esbensen et al., 2001 validating this)	Joining gangs for protection, increased victimisation after initial gang involvement and greater involvement in violent delinquency are significantly associated with stable gang membership. Joining a gang for financial reasons was associated in desisting within one year.
71.	C5	Ngai, Cheung, and Ngai (2007)	Cognitive and social influences on gang involvement among delinquents in three Chinese cities.	N=229 delinquent youths in Hong Kong, n=312 youth from Guangzhou & n=297 youth from Shanghai	An attempt to ascertain risk or protective factors of gang involvement among Chinese youth.	Quantitative Case control Measure for gang affiliation: single item self-report (citing Yoder, 2003)	Essentially, expected and prior gang involvements were highest in Hong Kong. On the other hand, Hong Kong was the lowest on the youths' moral belief, parental control, attachment to teachers, theorizing about social problems, and friends' moral belief.
72.	C6	Olate, Salas-wright & Vaughn (2012)	Predicting violence and delinquency among high risk youth and youth gang members in San Salvador (El Salvador)	N=174 high risk youth and youth gang members (13-24) in El Salvador	An examination of the predictive power of risk factors in a population of high risk and gang involved youth from El Salvador	Quantitative Cross-sectional Measure of gang affiliation: unclear Measures: none needed for gang affiliation-others were evidence based where	Low future orientation, low empathy, educational difficulties, school expulsions, delinquent peers, gang membership and low social support were found to be significant risk factors of violence and delinquency

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						possible otherwise current or retrospective self report	
73.	C6	Palmer & Tilley (1995)	"Sexual access to females as a motivation for joining gangs: An evolutionary approach." Response.	N=57 gang affiliated males and N=63 non gang affiliated males from Colorado	Review of anecdotal evidence (literature review) that sexual access to women is a motivation of joining gangs for males.	Quantitative Cross-sectional (case-control) design Gang affiliation measure: self-report (unreported questions)	Gang-affiliated males had more sexual partners than non-gang-affiliated males. Male gang members have greater status and are more attractive to women and also have more access to women.
74.	C4	Pederson (2014)	Gang joining in Denmark; prevalence and correlates of street gang membership	School based students (gang/non-gang) from Copenhagen N=1,886	This paper examines gang joining in socially disadvantaged residential neighbourhoods with gang presence.	Quantitative Cross-sectional design Gang affiliation measure: Eurogang criteria	Gang membership was predicted by: poor parental monitoring, weak pro-social values and high risk lifestyles.
75.	C7	Porter & Alison (2004)	Behavioural coherence in violent group activity: An interpersonal model of sexually violent gang behaviour.	N=223 cases of archival sources such as law reports.	This study provides an analysis of offender-victim interactions of sexual violence committed in gangs.	Quantitative Cross-sectional design Gang affiliation measure: unreported	The thematic concepts underpinning the interpersonal circumplex can be extended to group activity and sexually aggressive behaviour (see paper for fuller findings-extensive).
76.	C6	Porter & Alison (2005)	The Primacy of Decision-Action as an Influence Strategy of Violent Gang Leaders	N=37 offenders involved in different cases of group rape from Norway.	This study examined the relationship between decisions, actions, and orders as facets of influence, both over criminal events and group members, for 37 leaders of sexually violent gangs.	Quantitative Cross-sectional analysis Gang affiliation: determined from third party report in archival data	The results are discussed in terms of the psychological processes involved in influence strategies as effecting group activity.
77.	C1	Pyrooz (2014)	From your first cigarette to your last dyin' day: The patterning of gang membership in the life-course	National Longitudinal Survey of Youth (US) (subsample: n=8,984)	An examination of the contours of gang membership and their variability in the life-course.	Quantitative Cohort study design utilising longitudinal data Gang affiliation measure: self nomination	Identified risks for gang affiliation are: Being Black or Hispanic; male; from single parent family; parents with less education; poverty; socioeconomically disadvantaged neighbourhood; urban and aged 13-15 (although this paper highlights the variability and changeable nature of gang onset.
78.	C3	Pyrooz, Sweeten & Piquero (2013)	Continuity and change in gang membership and gang embeddedness.	N=226 adjudicated youth reporting gang membership at the baseline interview (14-17 yrs) from Philadelphia of Pheonix.	This study explores the relationship between embeddedness in a gang, a type of deviant network, and desistance from gang membership.	Quantitative Cohort study design utilising longitudinal data Gang measure: self nomination in response to researcher question	Gang embeddedness is associated with slowing the rate of desistance from gang membership over the full five-year study period. Gang members with low levels of embeddedness leave the gang quickly, crossing a 50 percent threshold in six months after the baseline interview, whereas high levels of embeddedness delays similar reductions until about two years. Males, Hispanics, and Blacks were

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							associated with greater continuity in gang membership as well as those with low self-control.
79.	C1	Pyrooz, & Sweeten (2015)	Gang Membership Between Ages 5 and 17 Years in the United States	Age-specific patterns of gang joining, participation, and leaving are estimated based on youths (n=7,335) self-reported gang membership at the baseline and eight subsequent interviews, which were combined with population age estimates from the 2010 U.S.	This study determined the frequency, prevalence, and turnover in gang membership between ages 5 and 17 years in the United States.	Quantitative Cohort study design utilising longitudinal data Gang affiliation measure: self-nomination	Youth gang members were disproportionately male, black, Hispanic, from single-parent households, and families living below the poverty level.
80.	C4	Rufino, Fox & Kercher (2011)	Gang membership and crime victimization among prison inmates	A sample of both gang (n=84) and non-gang (n=133) member prison inmates in Texas	The current study aimed to contribute to the emerging gang-victimization literature by examining: (1) characteristics of victimization for gang and non-gang members, (2) descriptors of gang membership comparing victimized to non-victimized gang members, and (3) characteristics of gang membership conduct comparing victimized to non-victimized gang members.	Quantitative Cross-sectional design with some retrospective reporting Gang measure: self report and police intelligence when gang affiliation denied	Results indicate that gang members were significantly more likely to be victimized compared to non-gang members and gang members were more likely to be alone and under the influence of substances when victimized.
81.	C5	Ryan, Miller-Loessi & Nieri (2007)	Relationships with adults as predictors of substance abuse, gang involvement, and threats to safety among disadvantaged urban high school adolescents	N=342 ethnically diverse high school students in an economically disadvantaged urban area in the south-western United States,	An examination of the protective effects of parental support, self-disclosure to parents, parent initiated monitoring of adolescent behaviour, and relationships with school personnel on substance abuse, gang involvement and perceived threats to safety at school.	Quantitative Cross-sectional study Measures: self report researcher led questions about gang involvement	The specific protective roles of parental support, self-disclosure to parents, parent initiated monitoring of adolescent behaviour, and relationships with school personnel related to problematic outcomes. Adolescent self-disclosure to parents was associated with less chance of substance use in those already involved with gangs.
82.	39	Salaam (2011)	Motivations for gang membership in Lagos, Nigeria: Challenge and Resilience	N=202 16-25 year old gang members from Lagos	A study of the main challenges that may influence unemployed youth's involvement in gang and criminal activity in Lagos: Nigeria	Mixed methods (quantitatively assigned) Cross sectional	Large families, rural/ urban migration, poverty and police corruption were cited as experiences youths had had prior to joining gangs. Joining gangs was an attempt to 'improve their lot in life'.

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						Measures: gang affiliation by limited self report	
83.	C6	Sirpal (2002)	Familial Criminality, Familial Drug Use, and Gang Membership: Youth Criminality, Drug Use, and Gang Membership--What Are the Connections?	N=201 (71 gang affiliated) 20-23 years U.S.	In an attempt to explore how familial criminality and familial drug and alcohol use affected children's decisions to use drugs and alcohol, join gangs, and/or get involved in delinquent behaviour.	Quantitative cross-sectional design Gang membership: measured by: parental 5 item self-report regarding their child	The analyses of this study indicated three major conclusions: (1) parental criminality and drug use enhances gang membership; (2) parental criminality and drug use enhanced gang membership and drug use; and (3) parental criminality and drug use enhanced gang membership, drug use, and delinquency. These conclusions indicate that family criminality significantly enhanced the probability of youth getting involved in criminal and gang activities.
84.	C1	Tapia (2011)	Gang membership and race as risk factors for juvenile arrest	Longitudinal data from the National Longitudinal Survey of Youth (12-14 years of age n= 3881) who were gang members and been frequently arrested.	This study addresses the link between gang membership and arrest frequency, exploring the gang X race interaction on those arrests	Quantitative Cohort study Measure of gang membership: NLSY97 criteria	Gang membership, racial minority status and their interaction, each increase the risk of arrest. Bias against these groups is more pronounced with less serious crimes. Black youth demonstrate the strongest effects.
85.	C5	Taylor, Freng, Esbensen & Peterson (2008)	Gang membership as a risk factor for serious violent victimisation: Importance of Lifestyles and Routine Activities	Pre-collected data of eighth grade youth attending public schools in the US (n=5,935)	An exploration of whether gang members' involvement in delinquent lifestyles and routine activities is a viable explanation for their increased risk of serious violent victimisation.	Quantitative Correlation study Gang measure: self-report on current status-single item question	Gang members were found to be at greater likelihood of being the victims of serious violence than non-gang members. Gang victims were not found to experience any different levels of violent victimisation than non-gang victims. Lifestyles and routine activities (particularly delinquency in terms of prevalence) substantially or completely mediated the relationship between gang membership and serious violent victimisation.
86.	C6	Taylor, Lerner, Eye, Bobek, Balsano, Dowling & Anderson (2003)	Positive individual and social behaviour among gang and non-gang African American male adolescents	N=45 African American adolescent gang male members from Detroit and 50 African American non-gang affiliated adolescents from the same community	To explore potential bases of development among gang youth.	Quantitative Case-control Measures: self report described and referenced	A quarter of the gang-affiliated group had more positive attribution scores than the average score in the non-gang group.
87.	C6	Taylor, Lerner, von Eye, Bobek, Balsano & Dowling (2004)	Internal and external developmental assets among African American male gang members.	N=45 African American adolescent male members of inner-city Detroit gangs and 50 African American adolescent males living in the same	The presence of individual and ecological assets for positive development was assessed.	Mixed methods (scored as quantitative) Cross sectional Gang affiliation scores: self-selection	The CBO youth had higher levels of both domains of assets. However, all gang members possessed at least one asset, and 15.6% of the gang youth had a total mean asset score that was above the total mean asset score of the CBO youth. The asset scores for the former group were

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				communities but involved in community-based organizations (CBOs)			significantly more likely to be correlated than was the case for the later group.
88.	C4	Thompson & Braaten-Antrim (1998)	Youth maltreatment and gang involvement.	N=2, 468 6 th -12 th grade US students	This research examines whether sexual or physical maltreatment raises the risk of gang involvement in secondary school.	Quantitative Cross-sectional design using survey data Gang affiliation: questionnaire with focus on fighting behaviour	Maltreatment increases the probability of gang involvement, independent of demographic factors. When youth are physically beaten or sexually molested, their odds of gang involvement increases by four times in comparison to control groups. Maltreatment is a higher risk indicator than levels of support, communication, educational interest and parental supervision.
89.	C5	Thornberry, Krohn, Lizotte & Chard-Wierschem (1993)	The role of juvenile gangs in facilitating delinquent behaviour.	Data from the Rochester Youth Development Study non gang-affiliated and gang-affiliated (n=3,372)	This study examines alternative explanations for why gang members are more likely to have higher rates of serious and violent crime than non gang members.	Quantitative Cross-sectional study utilising data from multi-wave panel data Gang measures: self-report	Gang members did not have higher rates of delinquent behaviour or drug use, before entering the gang than non gang-affiliated youth. However, upon entering the gang, these rates increased significantly. Delinquency rates dropped significantly once they left the gang.
90.	C6	Valdez, Kaplan & Codina (2000)	Psychopathy among Mexican American gang members: A comparative study.	A stratified proportional sample (N=150) people was drawn from the rosters of 26 gangs and administered a life history/intensive interview in San Antonio, Texas	The Hare Psychopathy Checklist–Screening Version was compared in a random sample of gang members with a matched community sample of violent non-gang members and samples of forensic and psychiatric patients and undergraduate students.	Quantitative Cross-sectional Gang affiliation measure: unclear	More than half of the gang sample were categorized as low, 44% as moderate, and only 4% as high on psychopathy. The gang members had higher scores on the total, affective, and behavioural scores than the non-gang members. High scores on adolescent antisocial behaviour, poor behavioural controls, and lack of remorse were found in both samples. Gang members scored twice as high as non-gang members on lack of empathy. Both samples were lower on psychopathy than the forensics and higher than psychiatric patients and undergraduates.
91.	C5	Valdez, Kaplan & Capeda (2006)	The Drugs-Violence Nexus Among Mexican-American Gang Members	N=160 male gang members sampled from 26 gangs in a Southwestern city (14-25).	This study examines hypotheses and builds models to help clarify the causal connections between drugs and violence outcomes among Mexican-American male gang members.	Quantitative Cross sectional analysis Measures: self report to specific measure but not referenced	The study concludes that drug use interacts with an individual gang member's risk for violence to affect violent behaviour outcomes. Furthermore, an important situational variable explaining violent outcomes among respondents scoring high on the violence risk measure was whether the rival was using drugs that resulted in high intoxication levels. The study concludes that drugs have a modulating and mediating influence on violence that is

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							conditioned by situational and individual level variables among members of these adolescent street gangs
92.	C6	Vasquez, Osman & Wood (2012)	Rumination and the Displacement of Aggression in United Kingdom Gang-Affiliated Youth	N=310 youth (185 males and 125 females) of 13-16 years from UK-gang and non gang affiliated	This study examined the tendency of UK youth to engage in displaced aggression (aggression aimed at undeserving targets) and examined the relationship among gang affiliation, ruminative thought, and aggression levels.	Quantitative Cross sectional design Measures used: gang measures consist of self-report on three pragmatic items.	The analyses found a three-way interaction between gang affiliation, rumination, and gender, such that males who were high in affiliation and rumination had the greatest tendency to displace aggression toward innocent others. Additionally, it was shown that rumination could account for a significant part of the correlation between gang affiliation and displaced aggression. Furthermore, regression analyses showed that even after controlling for trait aggression, anger, hostility, and irritability, rumination remained a significant predictor of displaced aggression.
93.	C5	Volkman, Fraga, Brodine, Iniguez-Stevens, Cepeda, Elder & Garfein (2013)	Drug-scene familiarity and exposure to gang violence among residents in a rural farming community in Baja California, Mexico	N=164 members of a single colonia. Median age of 27 years and 42% reported exposure to gang violence.	Assessment of exposure to gang violence and drug scene familiarity and other health indicators to identify familiarity and exposure to gang violence and the drug scene in a rural farming community in Mexico.	Quantitative Cross-sectional Measures: self-report but unclear	Exposure to gang violence was very common in this community and was associated with drug scene familiarity, suggesting a close relationship between drugs and gang violence in this rural community.
94.	C5	Walker-Barnes & Mason (2001)	Ethnic Differences in the Effect of Parenting on Gang Involvement and Gang Delinquency: A Longitudinal, Hierarchical Linear Modelling Perspective	N=300 ninth-grade students from an urban, south eastern city (US); (55% male), ranging in age from 13 to 18 years (M = 14.59, SD = .77).	This study examined the relative influence of peer and parenting behaviour on changes in adolescent gang involvement and gang-related delinquency	Quantitative Cross-sectional design Gang affiliation measured on the: Gang Membership Inventory	Adolescent gang involvement and gang-related delinquency were most strongly predicted by peer gang involvement and peer gang delinquency, respectively. Nevertheless, parenting behaviour continued to significantly predict change in both gang involvement and gang delinquency, even after controlling for peer behaviour. A significant interaction between parenting and ethnic and cultural heritage found the effect of parenting to be particularly salient for Black students, for whom higher levels of behavioural control and lower levels of lax parental control were related to better behavioural outcomes over time, whereas higher levels of psychological control predicted worse behavioural outcomes.
95.	C6	Wang (1994)	Pride and prejudice in high school gang members.	N=78 Caucasian and n=77 African American students (gang and	This study compared gang versus non gang high school students against a range of risk	Quantitative Case control design	Gang members could name fewer role models than non-gang members. Absence of positive parent and teacher roles were most predictive of gang membership

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				non-gang affiliated surrounding Florida)	factors to differentiate between groups.	Gang affiliation measures: unclear-report from staff?	between these two groups. Gang members had lower self-esteem than non gang-affiliated members, but were not more racist in their attitudes.
96.	C5	Webb, Katz & Decker (2006)	Assessing the Validity of Self-Reports by Gang Members: Results From the Arrestee Drug Abuse Monitoring Program.	Pre-existing data collected as part of the ADAM program (n=939) U.S.	This study examines disclosure rates of recent drug use by gang members in comparison with their urinalysis outcomes.	Quantitative Cross-sectional Gang affiliation measure: Self-report on four levels of gang association	Self-reports of illegal behaviour are a valid measurement technique in gang research.
97.	C2	Weerman, Lovegrove & Thornberry (2015)	Gang membership transition and its consequences: Exploring changes related to joining and leaving gangs in two countries	Rochester Youth Development Study & NSCR School study data (longitudinal) N=1385	This study explores how gang membership transitions among adolescents are related to changes with regard to peers, conventional social bonds and problem behaviour.	Quantitative Cohort study design utilising longitudinal data Gang-affiliation measure: Self-nomination	Gang joining is related to increasing exposure to negative peer influences, a weakening of conventional bonds and increasing levels of delinquency and substance use.
98.	C7	White & Mason (2006)	Youth Gangs and Youth Violence: Charting the Key Dimensions.	The sample comprised of pre-existing data from a selection of students from grades 10 through 12 (age range between 14 and 18 years of age) at seven schools throughout the Perth metropolitan area. N=743	This article examines issues surrounding the relationship between youth gangs and violent behaviour by considering the complex definitional and methodological problems surrounding these matters.	Quantitative Cross-sectional Gang affiliation measured by: two item self-report	We argue that most teenagers appear to engage in very similar types of activities, including violence. However, the intensity and dynamics of this behaviour varies greatly depending upon the type of group membership in question. Typologies are presented to show the differences in antisocial behaviour depending upon gang or non-gang membership.
99.	C5	Winfrey Jr., Bernat, Esbensen (2001)	Hispanic and Anglo gang membership in two southwestern cities.	The National Evaluation of G.R.E.A.T. provided this study's data. . This study included over N=800 students from Phoenix, Arizona, and Las Cruces, New Mexico (n=unclear)	The current study presents a systematic comparison of the gang-related attitudes and behaviour of youths living in cities of dramatically differing size but subjected to similar cultural forces.	Quantitative Cross-sectional design Gang-affiliation measure: unclear	While statistical comparisons supported the position that the Phoenix children expressed higher levels of pro-gang attitudes, there did not appear to be significant differences in self-reported gang membership. Hispanic youths in both cities were not only more pro-gang in their attitudes and orientations, but they reported higher levels of gang membership. However, multivariate analyses reveal that a far more complex set of forces is at work.
100.	C5	Wood, Moir & James (2009)	Prisoners' gang-related activity: The importance of bullying and moral disengagement.	N=141 adult male prisoners from a category B (medium to high security) prison in	An investigation into the relationship between gang-related activity and effective management of	Quantitative Gang Affiliation measure: Prisoner Gang Activities	Prisoners most involved in gang-related activity were likely to have spent a longer total time in the prison system, be perpetrators of bullying and have high

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				the south-east of England	prisons in the UK. Focus on street gangs and subsequent moral attitudes within prison.	Questionnaire (Wood, 2002)	levels of moral disengagement. Findings also show that moral disengagement partially mediates the relationship between bullying and gang-related activity.
101.	C5	Yoder, Whitbeck & Hoyt (2003)	Gang involvement and membership among homeless and runaway youth.	N= 602 homeless and runaway youth in mid-western state.	The present study documented the extent of gang involvement and gang membership in homeless and runaway youth.	Quantitative Cross-sectional design Gang affiliation measure: self-report on four items identified by research team	Youth gang members and gang-involved youth reported more family legal problems, had been suspended from school more, ran away at a younger age, used more alcohol and drugs, were exposed to more deviant peers, and attempted suicide more than did non gang youth. In addition, youth gang members reported less parental monitoring, more severe abuse, more street victimization, and more deviant subsistence strategies than did either gang involved or non-involved youth.
102.	C3	Zhang, Welte & Wieczorek (1999)	Youth gangs, drug use, and delinquency	Data from the first two waves of the Buffalo Longitudinal Survey of Young Men (n=625 males aged sixteen to nineteen in the area surrounding Buffalo, New York).	This study addressed the relationship among youth gangs, drug use, and delinquency by focusing on: (1) the effects of prior drug use and delinquency on gang membership; (2) the effect of gang membership on drug use and delinquency; and (3) the interaction effects of prior drug use and delinquency with gang membership on drug use and delinquency.	Quantitative Design: Cohort study (correlation study) utilising longitudinal data Gang membership Measure: self- report (current and past)	The data indicate that prior delinquency significantly affects gang membership, while prior drug use has no effect on gang membership. Gang membership has an effect on subsequent delinquency and drug use, although its effect on subsequent delinquency is fairly modest. Finally, there are interaction effects between gang membership and prior delinquency/drug use on subsequent delinquency/drug use.

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Summary of Countries the Studies were Undertaken In

Countries studies were undertaken in	Number of studies undertaken in this country (n)
USA	76
El Salvador	1
U.S.A. and El Salvador	1
Mexico	2
U.K.	8
U.K. and U.S.A.	1
Singapore	2
Norway	1
South Africa	1
Denmark	1
Nigeria	1
Hong Kong and China	1
Australia	1
Canada	5
Hong Kong	1

Appendix D: Coded list of risks

	<p>Low family relationships (Florian-Lacy et al., 2002)</p> <p>Lack of relationship with family-gang fills need (Lui & Fung, 2005)</p> <p>Parental criminality and drug use enhances gang membership (Sirpal, 2002)</p> <p>Parental criminality and drug use enhanced gang membership and drug use (Sirpal, 2002)</p> <p>Parental criminality and drug use enhanced gang membership, drug use, and delinquency (Sirpal, 2002)</p> <p>These conclusions indicate that family criminality significantly enhanced the probability of youth getting involved in criminal and gang activities (Sirpal, 2002)</p> <p>Large families (Salaam, 2011)</p> <p>Sense of belonging related to antisocial behaviour (Lachman et al., 2013)</p>
C7	N/A

School	
Code	Findings
C1	N/A
C2	School failure (Dishion, 2005; Dishion, 2010)
C3	School (Hill et al., 1999)
C4	Commitment to school low (Alleyne & Wood, 2011)
C5	<p>Negative attitudes to teachers (Ngai et al., 2007)</p> <p>Suspended (Farmer & Hairston, 2013; Yoder et al., 2003)</p>
C6	<p>School attainment / LD not an issue (Florian-Lacy et al., 2002; Hermann et al., 1997)</p> <p>Relationship with teacher predictive (Wang, 1994)</p>
C7	Perceived academic ability (Dukes et al., 1997)

Individual	
Code	Findings
C1	<p>CD/ ASBD (Lahey et al., 1999; Dmitrieva et al., 2014)</p> <p>Ethnicity (Tapia, 2011; Prooz, 2015)</p> <p>Gender (Pyrooz & Sweeten, 2015)</p> <p>Age 13-15 (Pyrooz, 2014)</p> <p>Low self-esteem/ Status(Dmitrieva et al., 2014)</p> <p>Diff perspective taking (Dmitrieva et al., 2014)</p> <p>Low responsibility (Dmitrieva et al., 2014)</p>
C2	<p>Antisocial behaviour and delinquency (Dishion et al., 2005); Hispanic and Black individuals were associated with lower self-control when studied longitudinally (DeLisi et al., 2009; Gatti et al., 2005). Males associated with greater continuity in gangs and having lower self-control when studied longitudinally (Sweeten & Piquero, 2013)</p> <p>Genetic factors and environment are uniquely experienced by the individual (Barnes et al., 2012)</p> <p>Individual Violent victimisation is a consequence of gang affiliation, when personal characteristics have been controlled for (DeLisi, 2009; Barnes et al., 2012).</p> <p>Joining gangs for protection (Melde et al., 2012) but increased violent victimisation after joining gang and increased delinquency results in stable gang membership.</p> <p>Weak conventional bonds (Weerman et al., 2015) and need to belong (Gatti et al., 2005)</p> <p>Although some longitudinal papers highlighted that increased delinquency (Weerman et al., 2015) predicted gang membership, it was found that a delinquency increase is often facilitated by gang affiliation (Barnes et al., 2010)</p> <p>Increased substance use predictor (Weerman et al., 2015; Gatti et al., 2005).</p> <p>Economic hardship is a consequence of gang affiliation (Krohn et al 2011).</p> <p>Individuals motivated to join gangs for financial gain were found to desist within one year (Melde et al., 2012)</p> <p>Ethnicity is not significant over time and immigration status is also not a predictor (Esbensen & Carson, 2012)</p> <p>Drugs (Bjerragaard, 2010)</p>
C3	<p>Hispanic and Black individuals were associated with lower self-control when studied longitudinally (Pyrooz, Sweeten & Piquero, 2012)</p> <p>More fighting behaviour, hyperactivity, inattention and oppositional behaviour, and self-reported delinquent activities (drug and alcohol use, stealing and vandalism). Peers rated gang members as more aggressive than non-gang members (Craig et al., 2002)</p> <p>ASB increased post gang affiliation but only to a modest degree in comparison to the effect of gang affiliation on drug use (Zhang et al., 1999)</p> <p>Males, Hispanics, and Blacks were associated with greater continuity in gang membership as well as those with low self-control (Pyrooz et al., 2012)</p> <p>Substance use increases when joining gang (Zhang et al., 1999)</p> <p>Complex mediating factors (Winfree et al., 2001)</p>
C4	<p>Violent victimisation (Katz et al 2011; Rufino et al., 200) which remained even when gang affiliation had been controlled for (Katz et al 2011)</p> <p>Rufino et al., 200 noted that gang affiliated individuals tend to be alone under the influence of substances when assaulted.</p> <p>Gang affiliated individuals experience a fear of further violence (Coid et al., 2013) and have high mental health needs; particularly trauma symptomology (Coid et al., 2013)</p> <p>Anti-authority attitudes were noted (Alleyne & Wood, 2013)</p>

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	<p>Moral disengagement and weak prosocial values were identified (Alleyne & Wood, 2013; Pederson, 2014)</p> <p>It appeared that social status was of importance (Alleyne & Wood, 2013) but that ethnicity, reflected community demographics and wasn't of unique significance (Alleyne & Wood, 2011)</p> <p>Gender also didn't emerge as significant (Alleyne & Wood, 2011) in this section</p>
C5	<p>Gang association linked to drug use familiarity and drug use (Volkman et al., 2013)</p> <p>Drug use interacts with violence (Valdez et al., 2006)</p> <p>Drug use associated with gang affiliation (Volkman et al., 2013).</p> <p>Thornberry et al (1993) found that individuals did not have higher rates of drug use prior to gang membership</p> <p>Greater gang involvement directly associated with greater alcohol and marijuana use over a lifetime (Harper et al., 2008)</p> <p>Increased alcohol and drug use (Yoder et al., 2003)</p> <p>Gang membership is associated with increased risk of psychological difficulties (Li et al., 2002)</p> <p>Gang membership associated with increased violence (Griffin & Hepburn, 2006)</p> <p>Melde & Esbensen (2011) would support that gang affiliation affects emotions, attitudes and social controls in a way that facilitates anti-social behaviour</p> <p>Anti-social behaviour and gang association link (Yoder et al., 2003)</p> <p>More involved in antisocial behaviour. Self-control was a strong predictor of gang membership, and appears to be in place prior to gang membership and remaining stable after gang membership (Hope & Damphousse, 2002)</p> <p>Gang affiliated individuals experience a fear of further violence (Lurigio et al., 2008)</p> <p>Gang affiliated individuals were also more likely to be stopped and searched, and have negative attitudes to the police (Lurigio et al., 2008).</p> <p>Those who are motivated to join gangs for a sense of belonging are less involved in antisocial behaviour than those who join for instrumental purposes (Lachman et al., 2013).</p> <p>PTSD Limited time perspective (Liu & Fung, 20)</p> <p>Ethnicity interacts with arrests (Black and lower class) but not gang affiliation (Brownfield et al., 2001)</p> <p>More complex than ethnicity alone (Winfrey et al., 2001)</p> <p>Gang members are more likely to be non-white (Hope & Damphousse, 2002)</p> <p>Violent victimisation associated with gang affiliation (Taylor et al., 2008)</p> <p>(Yoder et al., 2003) Violent street victimisation</p> <p>Riskier sex (King et al., 2013)</p> <p>Anti-authority (Alleyne & Wood, 2010)</p> <p>Need for social status (Alleyne & Wood, 2010)</p> <p>Less socially mature (Lyon & Hall, 1992).</p> <p>Less opportunity for success (Friedman et al., 1975)</p> <p>Blame victim (Alleyne & Wood, 2010)</p> <p>Morals (Ngai et al., 2007)</p> <p>Mental health difficulties higher (Harper et al., 2008)</p> <p>Depression (Harper et al., 2008)</p> <p>Suicidal (Yoder et al., 2003)</p> <p>Anxiety (Harper et al., 2008)</p> <p>Antisocial behaviour (Harper et al., 2008; Lyon & Hall, 1992; Friedman et al., 1975; Egan & Beaderman, 2011-linked to degree of gang embeddedness)</p> <p>Bullying associated with gang affiliation, mediated by moral disengagement (Wood et al., 2009)</p> <p>Excitement (Friedman et al., 1975)</p> <p>Low self-esteem ((Farmer & Hairston, 2013; Friedman et al., 1975)</p> <p>Gender male (Farmer & Hairston, 2013)</p> <p>Male (Hope & Damphousse, 2002)</p> <p>Poverty (free lunch) (Farmer & Hairston, 2013)</p> <p>Hope & Damphousse, (2002) lower social class.</p> <p>Gang members had more negative perceptions about authority law enforcement and laws and are more enthusiastic about engaging in illegal activities. They are more likely to justify terrorist acts than non gang-affiliated youth (Kakar, 2008)</p>
C6	<p>Criminological need profiles look same gang and non-gang except peer delinquency (Chu et al., 2011)</p> <p>Gang affiliation linked to antisocial behaviour (McDaniel, 2002; Bsiwas, 2011)</p> <p>Increased violence (Olate et al., 2012)</p> <p>Lack of self-control insignificant (Kissner et al., 2009)</p> <p>Pre-gang delinquency not predictive but more delinquent once in gang (Curry & Spergal, 1992)</p> <p>Rumination in males leads to displaced aggression directed towards innocent others and rumination best predictor of aggression (Vasquez et al., 2012),</p> <p>Antisocial behaviour only variable that divides two groups after controlling for mental health (Corcoran et al, 2005)</p> <p>Alcohol and drug use associated with gang affiliation (McDaniel, 2002; Danyko et al., 2002; Lyon & Hall, 1992)</p> <p>Gender male (Hermann et al., 1997)</p> <p>There is no significant difference between gender and gang relationship (Brownfield, 2012)</p> <p>Low future orientation (Biswas et al., 2011)</p> <p>Low self-esteem (Florian-Lacy et al., 2002)</p> <p>More sexualised behaviour (Biswas et al., 2011; Palmer & Tilley, 1995)</p> <p>More positive attribution scores associated with gang affiliation (Taylor et al., 2003)</p> <p>Manic smartness (Cartwright et al., 1970)</p> <p>Less self-realisation (Cartwright et al., 1970)</p> <p>Less suicidal ideations and suicide attempts (Evans, 1996)</p>

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	<p>Lack of empathy (Valdez et al, 2000)</p> <p>Lower psychopathy than forensic group but higher than control group (Valdez et al., 2000)</p> <p>PTSD (Danyko et al., 2002) low future orientation (Olate et al., 2012)</p> <p>Mental health difficulties higher (Harper et al., 2008; Corcoran et al, 2005-only item dividing two groups except antisocial behaviour-and self-destructiveness)</p> <p>Poverty and police corruption were cited as experiences youths had had prior to joining gangs. Joining gangs was an attempt to 'improve their lot in life' (Salaam, 2011)</p> <p>Gang members report more mental health symptoms, more external behaviour problems including delinquency and self-destructiveness and thought problems than non-gang members. When mental health symptoms were statistically controlled, gang members were indistinguishable from non-gang members on all variables except for antisocial behaviours (Corcoran et al., 2005)</p>
C7	<p>Low self-esteem (Dukes et al., 1997)</p> <p>Low psychosocial health (Dukes et al., 1997)</p> <p>Negative attitudes to institutions (Dukes et al., 1997)</p> <p>More unprotected sex (Brooks et al., 2011)</p>

Peers	
Code	Findings
C1	Peer influence (Lahey et al., 1999; Dmitrieva et al., 2014)
C2	Increased negative peer pressure (Weerman et al., 2015; Evans et al., 1999)
C3	N/A
C4	Peer pressure seemed to be a significant factor (Alleyne & Wood, 2011)
C5	<p>Rejected by peers (Farmer & Hairston, 2013)</p> <p>Deviant peers (Yoder et al., 2003)</p> <p>Needing companionship and contact from heterosexual males-motivator for gang involvement (Friedman, 1975)</p> <p>Peer gang involvement (Walker-Barnes & Mason, 2001)</p> <p>Gang membership was found to independently affect delinquency beyond the effects of having delinquent friends (Kakar, 2005)</p>
C6	Lack of relationship with family -gang fills need for belonging (Lui & Fung, 2005)
C7	N/A

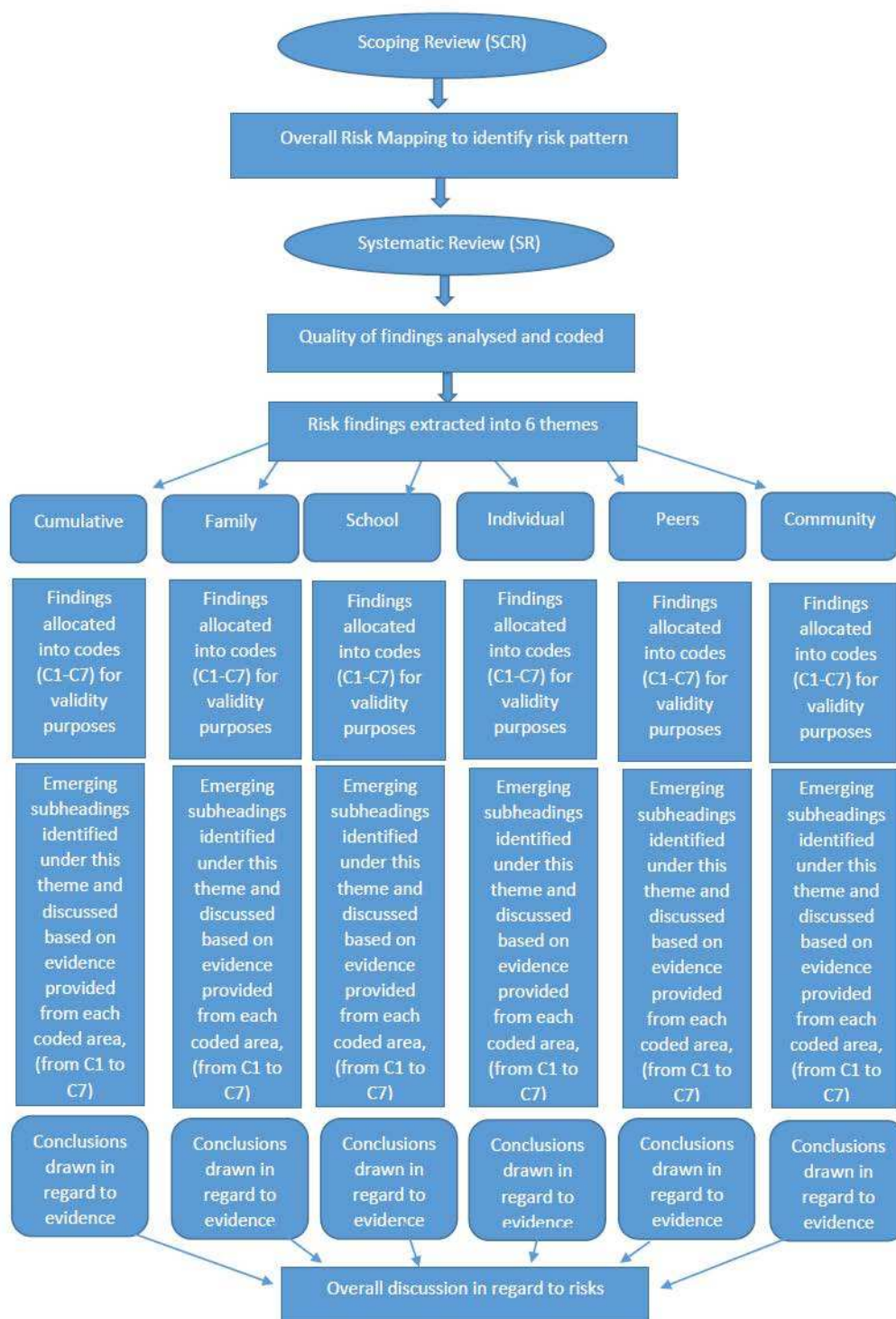
Community	
Code	Findings
C1	<p>Neighbourhood disadvantage (Pyrooz, 2014)</p> <p>Urban (Pyrooz, 2014)</p> <p>Antisocial neighbourhood (Gilman et al., 2014)</p>
C2	<p>Neighbourhood instability (Dupure et al., 2007) Presence of and exposure to gangs in the community (Evans et al., 1999)</p> <p>Threat to personal safety (Evans et al., 1999)</p>
C3	Neighbourhood predictive feature (Hill et al., 1999)
C4	Presence of and exposure to gangs in the community (Alleyne & Wood, 2013)
C5	<p>Gang presence (Luyt & Foster, 2001)</p> <p>Perceived neighbourhood as unsafe ((Farmer & Hairston, 2013)</p> <p>Need for protection (Friedman et al, 1975)</p>
C6	<p>Neighbourhoods have nontrivial effects on social development (Cadwallader & Cairns, 2002)</p> <p>Rural/ urban migration (Salaam, 2011)</p>
C7	N/A

Appendix D: Coded list of risks

Findings from literature review papers of gang literature

Howell & Egly	Offers a summary of studies focussing on risks utilising longitudinal cohorts and concludes with a developmental explanation of gang/ risk interactions.
Vittori, 2006	Large populations of young males, high levels of juvenile delinquency, drug use, high numbers of criminals in the population high poverty rates and a large number of single parent, mother-led families were factors contributing to countries associated with the emergence of gang activities.
Stinchcomb, 2002	The programs that appear to be unsuccessful are ones with detached street workers and police suppression strategies. The programs that appear to be promising are programs relevant to local needs, proactive strategies aimed at discouraging youths from joining gangs, school-based intervention and support programs, and comprehensive community programs. A key factor is pursuing a comprehensive, holistic approach that addresses multiple facets of the problem.
Sela-Shayovitz, 2011	Initial formations of moral panic derived from a profound concern about changes in the social and moral order of society due to immigration.
Sharkey, Shekhtmeyster, Chavez-Lopez, Norris & Sass, 2011	Schools can compensate for the attraction of gangs by addressing the hierarchical needs of at-risk youth.
Ulloa, Dyson & Wynes, 2012	Individuals from violent homes, violent communities, poor communities, and with previous abuse histories are at risk for both gang involvement and intimate partner violence. The literature suggests that this overlapping risk is multiplicative in its relationship to the experience of intimate partner violence. Taken alone, each risk factor can have damaging consequences, however, for those individuals with these risk factors who are involved in gangs, the risk for IPV is unmanageable.
Smith, 2011	The review identified various intelligence gaps but the small sample size meant that research recommendations were hard to find.
Kelly, 2010	Little research has focused on adolescents' exposure to gang violence and its effects on adolescents' mental health. Adolescents develop internalizing symptoms and externalizing behaviours after exposure to violence. More research on gang involvement and mental health consequences is called for.
O'Brien, Daffern, Meng Chu & Thomas, 2013	The characteristics, dynamics, and motivation to engage with peer networks emerged as a significant risk factor for gang affiliation. Therefore, gang intervention programs need to be multimodal and must address risk factors across multiple domains. There are a number of significant deficits and numerous methodological limitations in the extant literature. The field has only recently started to examine or formulate the psychological processes involved in gang affiliation and activities.
Palmer & Tilley, 1995	Gang-affiliated males had more sexual partners than non-gang-affiliated males. Male gang members have greater status and are more attractive to women and also have more access to women.

Appendix E: A diagrammatic explanation of the strategy for communicating risk findings





SUPPLEMENTARY MATERIAL ONLY FROM HERE

Appendix 1: P-GARM

UK Gang Affiliation Pilot Risk Measure

Part 1: Family

1. Had you witnessed violence at home?
 - ☐ Yes
 - ☐ No
 2. Did the people who lived with you sort out problems using violence?
 - ☐ Yes
 - ☐ No
 3. Did you usually tell your family where you were going, when you went out?
 - ☐ Yes
 - ☐ No
 4. When you got home from school, did anyone ask you how your day had been??
 - ☐ Yes
 - ☐ No
 5. Was your biological father living at home with you?
 - ☐ Yes
 - ☐ No
 6. Did you have a family member in a gang?
 - ☐ Yes
 - ☐ No
 7. Do you think that kids should be treated how you were treated at home?
 - ☐ Yes
 - ☐ No
 8. Had you experienced harsh discipline at home?
 - ☐ Yes
 - ☐ No
 - ☐ Prefer not to say
 9. Did your parents work?
 - ☐ Yes
 - ☐ No
 10. Did you feel protected from harmful or dangerous adults?
 - ☐ Yes
 - ☐ No
 - ☐ Prefer not to say
 11. Had you experienced sexual abuse?
 - ☐ Yes
 - ☐ No
 - ☐ Prefer not to say
-

12. Was your mum under the age of 20 when she had you?

- ☐ Yes
- ☐ No

13. Did you have a social worker?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Part 2: Education

14. Did you get kicked out of school at any point?

- ☐ Yes
- ☐ No

15. Did your teachers care if you did well at school?

- ☐ Yes
- ☐ No

16. Did your parents care if you did well at school?

- ☐ Yes
- ☐ No

17. Did you think that if you worked hard at school you'd get a good job?

- ☐ Yes
- ☐ No

18. Did you regularly bunk off school?

- ☐ Yes
- ☐ No

19. Did you like most of your teachers?

- ☐ Yes
- ☐ No

Part 3: Community

20. Were you aware of post code gangs in your area?

- ☐ Yes
- ☐ No

21. Had you witnessed violence in your area?

- ☐ Yes
- ☐ No

22. Did you think it was easier to make money on the roads than getting a job?

- ☐ Yes
- ☐ No

23. Did you often have a feeling of fear when leaving your front door?
- ☐ Yes
 - ☐ No
24. Did your friends seem to have more money than you?
- ☐ Yes
 - ☐ No
25. Were there areas you'd avoid you'd witnessed, experienced or heard about violence?
- ☐ Yes
 - ☐ No
26. Were there areas you could go to that felt calm, and not too hot for you?
- ☐ Yes
 - ☐ No
27. Were most of your friends on the roads?
- ☐ Yes
 - ☐ No
28. Were most of your friends in a gang?
- ☐ Yes
 - ☐ No
29. Did you know many people in gangs?
- ☐ Yes
 - ☐ No
30. Had you regularly heard about people being shot, stabbed or killed in your area?
- ☐ Yes
 - ☐ No
31. Were drugs available in your area?
- ☐ Yes
 - ☐ No
32. Did you know of shotting going on in your area?
- ☐ Yes
 - ☐ No

Part 4: Health

33. Had you smoked weed?
- ☐ Yes
 - ☐ No
34. Had you been badly beaten up?
- ☐ Yes
 - ☐ No
-

35. Had you been in trouble for fighting or hurting other people?

- ☐ Yes
- ☐ No

36. Had you got drunk?

- ☐ Yes
- ☐ No

37. Had you been bullied?

- ☐ Yes
- ☐ No

38. Did you find it easy to make friends with people who behaved well at school?

- ☐ Yes
- ☐ No

Part 5: Emotional Health

39. Did you often have aggressive thoughts?

- ☐ Yes
- ☐ No

40. Did you regularly have nightmares?

- ☐ Yes
- ☐ No

41. Did you have the sense that life would be short?

- ☐ Yes
- ☐ No

42. Was your area so hot for you that you had to look over your shoulder all the time, to stay safe?

- ☐ Yes
- ☐ No

43. Did unpleasant thoughts or images come into your mind unexpectedly; related to violent things you'd seen or heard?

- ☐ Yes
- ☐ No

44. Could you imagine yourself growing old?

- ☐ Yes
- ☐ No

45. Did you feel good about yourself?

- ☐ Yes
- ☐ No

46. Did you feel people respected you?

- ☐ Yes
 - ☐ No
-

47. When things went wrong in life, would you blame others?
- ☐ Yes
 - ☐ No
48. Did you worry a lot about things before you did them?
- ☐ Yes
 - ☐ No
49. Did you ever experience a racing heart, shaking, shortness of breath and the sense that something bad might happen?
- ☐ Yes
 - ☐ No
50. Did you experience thoughts that you'd be better off dead?
- ☐ Yes
 - ☐ No
51. Did you get angry easily?
- ☐ Yes
 - ☐ No
52. When you got angry, did it take you a long time to calm down?
- ☐ Yes
 - ☐ No
53. Did you find it hard to concentrate?
- ☐ Yes
 - ☐ No
54. Did you often do or say things in the moment, which you later regretted?
- ☐ Yes
 - ☐ No
55. Had you ever heard voices which didn't seem to belong to anyone around you?
- ☐ Yes
 - ☐ No
56. Had it seemed like your thoughts or behaviour were controlled by something other than you?
- ☐ Yes
 - ☐ No
57. Sometimes people hurt themselves when they feel stressed. Is this something you had done?
- ☐ Yes
 - ☐ No
58. Had you been able to talk to someone about your feelings, like a counsellor or psychologist?
- ☐ Yes
 - ☐ No
-



Appendix 2: GARM for Main Study

G. A. R. M.

Introduction to the Research Project

Hi

Thank you so much for agreeing to meet with me/ take part. I am going to tell you a bit more information about this research and then you will be able to decide whether or not you'd like to be more involved.

What is the purpose of the study?

We know that many young people who join gangs have faced difficult life circumstances in the past, and may unfortunately not have received support with these when they were younger. By joining a gang, they may feel more protected, but they might also become exposed to further events, which can have a negative effect on them.

We are trying to identify risks factors connected to gang-affiliation in the UK, so that we can better support these young people earlier in their lives with the aim of decreasing the risk of harm to themselves and others, and improving their opportunities to succeed in life. We have read research telling us what some of the difficulties facing young people who later join gangs might be. We have also heard the voices of young people currently in gangs, or who used to be in gangs, who have given their accounts of the stressors and challenges they experienced as children. In addition to this, we have heard from professionals working locally, nationally and internationally about the risks that gang-affiliated young people have experienced and what support they might need.

From all of this, we have created a questionnaire. The idea is that if young people score highly on the questionnaire, we might see them as at risk of becoming gang-affiliated and therefore support could be put in place for them as soon of possible. Before we can be sure that this questionnaire is effective, it needs to be tested out and that is what this stage is all about.

Why have I been invited?

To test this questionnaire out, we have split participants in to two groups residing within the XXX (name of Local Authority Borough removed for safeguarding) area:

1. 100 Gang-affiliated young people
2. 100 Non gang-affiliated young people

We'd like to check whether this questionnaire works by testing it with both of these groups. We will then check that those who score highest are indeed gang-affiliated. This will then give us more confidence as to whether the questionnaire accurately captures appropriate risks.

You have been allocated in to one of these groups; either through self-reporting, professional recommendation or random selection. Either due to your age, your residency or your life experiences, we feel that your views will assist us in ensuring that our questionnaire is an accurate measure of risk for gang involvement.

Do I have to take part?

It will be **totally your choice** whether or not you are involved. If you choose not to be involved, this will not affect you in any way. In fact, even if you do choose to be involved, you may change your mind at any point until the publication date.

What will it involve if I do take part?

If you do choose to be involved, the questionnaires take approximately half an hour to complete. You will be supported by an interviewer who will come to your service and use a quiet room, in order to assist you in completing the questions. At the start and the end, there will be time for the interviewer to answer any questions you may have.

The advantages of taking part are that you will be assisting us in testing a measure which aims to help young people at risk of joining gangs, in order to meet their needs earlier and improve their future life opportunities. The disadvantage of taking part is that it could be distressing for you to think back on your life and share some of the difficulties you have faced. In order to reduce this risk, most of the questions are simply 'yes' or 'no' questions so that you don't need to provide much detail.

Additionally, the interviewer will be a trained local therapist, who will have experience of making interviews such as this one as comfortable as possible, and will also be able to provide you with support materials if needed before finishing the interview. If you are completing the questionnaire electronically, please feel free to ask via email when returning the form if you would like follow up support numbers in addition to the ones provided here.

It is advised that you discuss the advantages and disadvantages of taking part with someone who knows you well, to help you make the right decision *for you* prior to participating.

Complaints

A contact number for the supervisor of the research project will be given to you by your interviewer. This named person will be available for a discussion about any issues you may have relating to the interview process.

Will my taking part in this study be kept confidential?

Your completed questionnaire will be anonymised, and given a code as soon as we receive it, so that we know which group you were originally placed in. After the data has been entered on to the computer, your original questionnaire will be put in the shredder and will no longer exist. We will separate your consent sheet and demographic sheet from your answers even when we transport it, so no-one at all will know that your answers are yours, and I am bound by confidentiality, so I can't tell any one else that your answers were yours! We will not be sharing your feedback with any other service.

Only the researcher will have access to your data. This will be kept on a password protected memory stick and stored in a locked location, only accessible to the researcher. It will remain in this location for ten years at which point it will be permanently destroyed.

What will happen to the results of the research study?

The data produced will assist us to create a measure of risk or gang involvement, and assist us in considering effective early intervention support. This will be made in to a written report, which we are aiming to publish. All participants will have the opportunity to receive a copy of the research we write, so you can see how your assistance resulted in a final product.

Who is organising and funding the research?

The research is organised by Canterbury Christ Church University. Additional funding has been contributed from XXX (name of Local Authority Borough removed for safeguarding) Council.

Who has reviewed the study?

This study has been reviewed and approved by Canterbury Christ Church Research Ethics Committee. This study has also been reviewed and supported by XXX (name of Local Authority Borough removed for safeguarding) Council Ethics Board.

Consent Form

Researcher to complete

Centre Code:
Study Code:
Participant Code:

To be completed by participant:

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to ask questions, reflect on the responses, and consider whether I would like to be involved.
2. I understand that my participation is voluntary and that I am free to withdraw at any point, without giving any reason and without, medical care or legal rights being affected.
3. I understand that my involvement will create data, which will later be anonymised.
4. I have been given support numbers, in case this is needed following the research.
5. I have been given a complaint form in case this is needed, following the research.
6. I agree to take part in the study and I am over the age of 16.

Date: _____

Signature (initials will be okay): _____

Name of Researcher (who must ensure that participants are deemed able to sign consent): _____ **/Date** _____ **/ Signature**

1 (SCREENING) DEMOGRAPHIC DATA

Participant code:

DATE OF BIRTH:

__/__/____
(DD / MMM / YYYY)

ETHNICITY

White	White British <input type="checkbox"/>	White Irish <input type="checkbox"/>	White Other <input type="checkbox"/>
Mixed race	White & Black Caribbean <input type="checkbox"/>	White & Black African <input type="checkbox"/>	White & Asian <input type="checkbox"/> Other mixed background <input type="checkbox"/>
Asian or Asian British	Indian <input type="checkbox"/>	Bangladeshi <input type="checkbox"/>	Pakistani <input type="checkbox"/> Other Asian background <input type="checkbox"/>
Black or Black British	Caribbean <input type="checkbox"/>	African <input type="checkbox"/>	Black Other <input type="checkbox"/>
Chinese or other ethnicity	Chinese <input type="checkbox"/>	Other <input type="checkbox"/> (please specify)	

GENDER:

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Self Identify: _____

SEXUALITY:

Do you identify with any of the following? Tick all that apply.

- ☐ Straight
- ☐ Gay
- ☐ Lesbian
- ☐ Bisexual
- ☐ Cisgender (You are comfortable in the gender you were assigned at birth)
- ☐ Transgender (You are not comfortable in the gender you were assigned at birth)
- ☐ Self Identify: _____

The Questionnaire

Researcher prompt: Thank you for agreeing to filling in this questionnaire. I am going to read the questions out. If there are any you want me to read again, please just ask me to. If there are any you don't understand, please ask me to explain a bit more and I will. After that, you will have the option of answering 'yes' or 'no'. Remember that your answers will help us to assist much younger children who may be at risk of joining gangs. It is really important that you answer the questions honestly, as your information will shape how we offer support to 'at risk' young people in XXX (name of Local Authority Borough removed for safeguarding). Your answers will be kept confidential and will not be shared with anyone else. We are not working with any other agencies. We are just a research team trying to find out the best ways of keeping young people in XXX (name of Local Authority Borough removed for safeguarding) safer. You can help us with that by allowing us to better understand the difficulties some of these young people might have faced in the past. You can do this by answering this questionnaire.

The questionnaire is trying to find out more about experiences you had before you started secondary school, so please try to think back to the last year of primary school when you are answering the following questions. Ok, are you ready to start? The first chunk of questions will be about family.

Part 1: Family

1. Had you witnessed violence at home?
 - ☐ Yes
 - ☐ No
2. Did the people who lived with you sort out problems using violence?
 - ☐ Yes
 - ☐ No
3. Did you usually tell your family where you were going, when you went out?
 - ☐ Yes
 - ☐ No
4. When you got home from school, did anyone ask you how your day had been?
 - ☐ Yes
 - ☐ No
5. Was your biological father living at home with you?
 - ☐ Yes
 - ☐ No
6. Did you have a family member in a gang?
 - ☐ Yes
 - ☐ No

7. Was your mum under the age of 20 when she had you?

- ☐ Yes
- ☐ No

Researcher prompt: How are you doing? Okay? These ones are a little less personal and more about your time at school, and the area you grew up in. Remember to think back to when you were at your last year of primary school when you are answering the following questions. Okay, here we go.

Part 2: Education

8. Did you get kicked out of school at any point?

- ☐ Yes
- ☐ No

Part 3: Community

9. Were you aware of post code gangs in your area?

- ☐ Yes
- ☐ No

10. Had you witnessed violence in your area?

- ☐ Yes
- ☐ No

11. Did you think it was easier to make money through gang involvement rather than getting a job?

- ☐ Yes
- ☐ No

12. Did you often have a feeling of fear when leaving your front door?

- ☐ Yes
- ☐ No

13. Did your friends seem to have more money than you?

- ☐ Yes
- ☐ No

14. Were there areas you'd avoid because you'd witnessed, experienced or heard about violence?

- ☐ Yes
- ☐ No

15. Were there areas you could go to that felt calm and safe?

- ☐ Yes
- ☐ No

16. Had you regularly heard about people being shot, stabbed or killed in your area?

- ☐ Yes
- ☐ No

Researcher prompt: Ok? These questions are more about health now. We're about half way through. Remember to think back to when you were at your last year of primary school when you are answering the following questions. Ok, let's continue.

Part 4: Health

17. Had you been badly beaten up?

- ☐ Yes
- ☐ No

18. Had you been in trouble for fighting or hurting other people?

- ☐ Yes
- ☐ No

Part 5: Emotional Health

19. Did you *often* have aggressive thoughts?

- ☐ Yes
- ☐ No

20. Did you *regularly* have nightmares?

- ☐ Yes
- ☐ No

21. Did you have the sense that life would be short?

- ☐ Yes
- ☐ No

22. In your area, did you feel that you had to look over your shoulder all the time, to stay safe?

- ☐ Yes
- ☐ No

23. Did unpleasant thoughts or images come into your mind unexpectedly; related to violent things you'd seen or heard?

- ☐ Yes
- ☐ No

24. Did you ever experience a racing heart, shaking, shortness of breath and the sense that something bad might happen?

- ☐ Yes
- ☐ No

25. When you got angry, did it take you a long time to calm down?

- ☐ Yes

- ☐ No

26. Had it seemed like your thoughts or behaviour was controlled by something other than you?

- ☐ Yes
- ☐ No

Researcher Prompt: Lastly, it is useful for us to know which category to put you in, so that we know what the risks really are for young people in our research. Remember that the results will all come out like numeric data and charts. It won't be clear who has answered which question. Remember also, that this is confidential. When answering this question, you don't need to tell me any specific information, but can you tick which statement below applies best to you? I'll give this to you to do yourself. Please be honest-it will help us in our analysis of the results.

27. As far as you are concerned, have you ever been involved in a gang in any of the following ways? (Please tick the one that best applies to you):

- ☐ I have been a member of a gang
- ☐ I have been loosely involved in a gang
- ☐ I hang around with lots of other people who are gang-affiliated, but I am not really in a gang myself
- ☐ I have never had anything to do with any one in a gang and I have never been involved in a gang myself

Researcher Prompt:

That's great. Well done sticking with it 'til we got all the way through to the end. You've done really well and your answers will help us to help young people in the area, in the future so **thank you**.

Distress Limitation and Maintenance of Emotional Well-Being

Please let us know, did the questionnaire cause you any distress?

- ☐ Yes
- ☐ No

Please then have a short dialogue and respond to any other questions they have for you about the process and respond to any clinical needs/ concerns/ support needs/ referrals etc.

If so, please see list below of supportive organisations if you feel you would benefit from contacting them. They all offer a confidential service. If you need something they can't offer, they should be able to signpost you to somewhere that will.

- The Samaritans: 08457 90 90 90 (a national 24 hr service offering emotional support to anyone in crisis)
- CRUSE: 0870167167 (a national bereavement helpline)
- Depression Alliance: 020 7633 0557 (a national organisation helping people with depression)
- FRANK (previously the National Drugs Helpline): 0800 77 66 00
- Alcohol Concern: 020 7922 8668
- **XXX (removed)** Offers confidential counselling and support for people under the age of 25 in XXX (name of Local Authority Borough removed for safeguarding)
- City and XXXXXXXX (name of Local Authority Borough removed for safeguarding) MIND
Offers confidential counselling and support for people of all ages in XXXXXXXX (name of Local Authority Borough removed for safeguarding)
Confidential Helpline/ Local Authority helplines: **XXX (removed)**

Any complaints about this process please contact:
XXX (removed)

Researchers:

- ✓ Please set aside enough time for interviews (15 mins)
- ✓ Find a private space they feel comfortable in (not overheard).
- ✓ Be aware of safety issues for you and for the interviewee.
- ✓ Ensure you are able to exit the room easily and are not blocking the interviewees exit.
- ✓ Be approachable, warm, transparent, compassionate and comfortable with the subject.
- ✓ Make sure someone else knows where you are at all times and is checking on you.
- ✓ Respect the person's privacy and allow 'prefer not to say options'.
- ✓ Constantly check for body language and note this too. Ensure at the start you have made very clear that we will not share the info, that we have nothing to do with the police and that we are doing this to help children in the same positions as they may have been in-and that we need their expertise in order to do so-which lies in their lived experience.
- ✓ Make sure you have read and practiced the information/ consent sheets and questionnaires enough to deliver these in a conversational style, stopping to respond to any questions that may come up.
- ✓ Explain the limits of confidentiality (none of the responses on the questionnaire alone will lead to referral).
- ✓ Comply with local settings/ procedures.
- ✓ Spend some time at the start building a bit of rapport.
- ✓ In relation to the 'gang' issue-be up front about their selection, but if they say they are not in a gang, ask for their expertise anyway-and explain about the non-gang group. However, keep code the same. Just note it in your additional notes.
- ✓ Thank the young person afterwards.
- ✓ If they were distressed, offer them the list of support agencies and consider if a referral might be needed in discussion with the young person.
- ✓ If referrals need to be made, follow procedure.
- ✓ If you need support, contact the lead researcher.
- ✓ Follow procedure re data protection.

Blank researcher additional notes page:

EXIT INTERVIEW:

EXIT INTERVIEW:
Please ask: "Is there anything you feel that we haven't asked you about, which you think was important when you think about why you or other people become gang affiliated?....."

Also generally, please ensure there is time to ask some open questions about how it was to undertake the measure, their views on items etc.

[illegible]

Appendix 3: Final GARM

G. A. R. M.

Question no.	Question
-----------------	----------

-
- | | |
|----|--|
| 1 | Had you witnessed violence at home? |
| 2 | Did the people who lived with you sort out problems using violence? |
| 3 | Did you usually tell your family where you were going, when you went out? |
| 4 | When you got home from school, did anyone ask you how your day had been? |
| 5 | Was your biological father living at home with you? |
| 6 | Did you get kicked out of school at any point? |
| 7 | Were you aware of post-code gangs in your area? |
| 8 | Had you witnessed violence in your area? |
| 9 | Did you think it was easier to make money through gang involvement rather than getting a job? |
| 10 | Had you regularly heard about people being shot, stabbed or killed in your area? |
| 11 | Had you been badly beaten up? |
| 12 | Had you been in trouble for fighting or hurting other people? |
| 13 | Did you <i>often</i> have aggressive thoughts? |
| 14 | Did you have the sense that life would be short? |
| 15 | In your area, did you feel that you had to look over your shoulder all the time, to stay safe? |
-

Appendix 4: T-GARM

T-G. A. R. M.

Item Number	Question	Score
1	Do you usually tell your family where you are going, when you go out?	Yes=0 No=1
2	Is your biological father living at home with you?	Yes=0 No=1
3	Have you been kicked out of school at any point?	No=0 Yes=1
4	Have you witnessed violence in your area?	No=0 Yes=1
5	Do you think it is easier to make money through gang involvement rather than getting a job?	No=0 Yes=1
6	Have you been badly beaten up?	No=0 Yes=1
7	Have you been in trouble for fighting or hurting other people?	No=0 Yes=1
8	Do you have the sense that life will be short?	No=0 Yes=1
9	In your area, do you feel that you have to look over your shoulder all the time, to stay safe?	No=0 Yes=1
10	When you get home from school, does anyone ask you how your day has been?	Yes=0 No=1
11	Have you witnessed violence at home?	No=0 Yes=1
12	Do you <i>often</i> have aggressive thoughts?	No=0 Yes=1
13	Do the people who you live with sort out problems using violence?	No=0 Yes=1
14	Have you regularly heard about people being shot, stabbed or killed in your area?	No=0 Yes=1
15	Are you aware of post code gangs in your area?	No=0 Yes=1

A total score of 7 or more would indicate risk of gang affiliation, and would suggest early intervention support is provided.

Appendix 5: Demographic Information

1 (SCREENING) DEMOGRAPHIC DATA

Participant code:

DATE OF BIRTH:

---/---/---
(DD / MMM / YYYY)

ETHNICITY

White	White British <input type="checkbox"/>	White Irish <input type="checkbox"/>	White Other <input type="checkbox"/>	
Mixed race	White & Black Caribbean <input type="checkbox"/>	White & Black African <input type="checkbox"/>	White & Asian <input type="checkbox"/>	Other mixed background <input type="checkbox"/>
Asian or Asian British	Indian <input type="checkbox"/>	Bangladeshi <input type="checkbox"/>	Pakistani <input type="checkbox"/>	Other Asian background <input type="checkbox"/>
Black or Black British	Caribbean <input type="checkbox"/>	African <input type="checkbox"/>	Black Other <input type="checkbox"/>	
Chinese or other ethnicity	Chinese <input type="checkbox"/>	Other <input type="checkbox"/> (please specify)		

GENDER:

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Self Identify: _____

SEXUALITY:

Do you identify with any of the following? Tick all that apply.

- ☐ Straight
- ☐ Gay
- ☐ Lesbian
- ☐ Bisexual
- ☐ Cisgender (You are comfortable in the gender you were assigned at birth)
- ☐ Transgender (You are not comfortable in the gender you were assigned at birth)
- ☐ Self Identify: _____

Appendix 6: Advert for Recruitment



WOULD YOU LIKE TO HELP TO ADVISE US ON WHAT RISKS YOU THINK LEAD TO GANG AFFILIATION, OR WHAT THINGS PROTECT YOU FROM BECOMING GANG INVOLVED?

WE ARE A RESEARCH TEAM TRYING TO BETTER UNDERSTAND WHY PEOPLE BETWEEN THE AGES OF 16-25 BECAME INVOLVED IN GANGS, WHETHER SERVICES SHOULD BE PROVIDING SUPPORT AND IF SO, WHAT WOULD HAVE BEEN USEFUL TO THEM. **WHETHER YOU ARE GANG-AFFILIATED OR NOT**, PLEASE LET US KNOW IF YOU WOULD LIKE TO ASSIST US AND YOU:

- **HAVE BEEN BORN IN THE FOLLOWING POSTCODES (REMOVED FOR CONFIDENTIALITY) AND RAISED IN XXX (REMOVED FOR CONFIDENTIALITY)**
- **ARE MALE**
- **HAVE APPROXIMATELY 30 MINUTES OF YOUR TIME TO SPARE**

THE DISCUSSIONS WILL BE **100% CONFIDENTIAL** AND WILL NOT FOCUS ON ANY **QUESTIONS DIRECTLY RELATED TO GANG AFFILIATION** (THEY WILL FOCUS MORE ON RISKS GROWING UP IN THIS AREA). AS YOUNG PEOPLE WHO HAVE GROWN UP HERE, WE'D LIKE TO LEARN FROM YOUR EXPERTISE, IF YOU HAVE THE TIME TO TALK TO US.

YOUR WORKERS KNOW ABOUT THIS RESEARCH. IF YOU ARE INTERESTED, PLEASE TALK MORE TO THEM ABOUT IT AND THEY WILL GIVE YOU MORE INFORMATION AS WELL AS TALK IT THROUGH WITH YOU IN MORE DETAIL. IF YOU'D THEN LIKE TO BE INVOLVED, YOUR WORKER WILL ARRANGE A TIME FOR US TO VISIT AND ANSWER ANY MORE QUESTIONS YOU MIGHT HAVE BEFORE WE START THE RESEARCH. AT EVERY STAGE YOU WILL HAVE THE CHOICE TO GO AHEAD OR NOT.

WE LOOK FORWARD TO HEARING FROM YOU ☺

CARLOTTA RABY (LEAD RESEARCHER)

Appendix 7: Information Sheet

Study Title

Identifying risks factors connected to gang-affiliation in the UK & development of a measure in order to appropriately target early intervention/ prevention and improve mental health outcomes

What is the purpose of the study?

We know that many young people who join gangs have had difficulties in the past and may not have received support for these when they were younger. By joining a gang, they may feel more protected, but they might also be exposed to further events, which can have a negative effect on their well-being.

This research is attempting to investigate life stressors, events and personal characteristics which create risks of young people joining gangs, so that services are able to better support these young people earlier in their lives and offer help with issues they are facing in order to offer them increased choice in paths they are taking through life; with the aim of decreasing harm and improving their opportunity to achieve their aspirations.

We have read research telling us what some of those difficulties might be. We have also heard the voices of some young people currently in gangs, or who used to be in gangs, who have given their accounts of the stressors and challenges they experienced. In addition to this, we have heard from professionals working locally, nationally and internationally about the risks that gang-affiliated young people have experienced and what support they feel they might need.

From all of this, we have created a questionnaire. The idea is that if young people score highly on the questionnaire, we might see them as at risk of becoming gang-affiliated and therefore support could be put in place for them as soon of possible to help with any difficulties they are facing, in order to maximise their life choices and reduce the risk of further harm. Before we can be sure that this questionnaire is effective, it needs to be tested out.

Why have I been invited?

To test this questionnaire out, we have split participants in to two groups residing within the XXXXXXXX (name of Local Authority Borough removed for safeguarding) area:

1. Gang-affiliated young people
2. Non gang-affiliated young people

We'd like to check whether this questionnaire works by testing it with each of these groups and checking that those who score highest are indeed gang-affiliated. This will then give us more confidence as to whether the questionnaire accurately captures appropriate risks.

You have been allocated in to one of these groups; either through self-reporting, professional recommendation or random selection. Either due to your age, your residency or your life experiences, we feel that your views will assist us in ensuring that our questionnaire is an accurate measure of risk for gang involvement.

Do I have to take part?

It will be totally your choice whether or not you are involved. If you choose not to be involved, this will not affect you in any way. In fact, even if you do choose to be involved, you may change your mind at any point until the publication date.

What will it involve if I do take part?

If you do choose to be involved, the questionnaires take approximately half an hour to complete. You will be supported by an interviewer who will come to your service and use a quiet room, in order to assist you in completing the questions. The process should take no more than an hour; to allow time for the interviewer to answer any questions you may have prior to the questionnaire and also to have some time to discuss how you found it, upon completion.

The advantages of taking part are that you will be assisting us in testing a measure which aims to help young people at risk of joining gangs, in order to meet their needs earlier and improve their future life opportunities. The disadvantage of taking part is that it could be distressing for you to think back on your life and share some of the difficulties you have faced. In order to reduce this risk, we will not be asking you questions that require any detail, they will only require yes or no answers. For example:

Do you feel you performed well in school, compared to your peers? Yes/ No

Additionally, the interviewer will be a trained local therapist, who will have experience of making interviews such as this one as comfortable as possible, and will also be able to provide you with support materials if needed before finishing the interview.

It is advised that you discuss the advantages and disadvantages of taking part with someone who knows you well, to help you make the right decision *for you*. You will be able to ask any additional questions you would like to the interviewer when they arrive, prior to participating and signing consent.

Complaints

A contact number for the supervisor of the research project will be given to you by your interviewer. This named person will be available for a discussion about any issues you may have relating to the interview process.

Will my taking part in this study be kept confidential?

Your completed questionnaire will be anonymised and given a code, so that we know which group you were originally placed in. After the data has been entered on to the computer, your original questionnaire will be put in the shredder and will no longer exist.

Only the researcher will have access to your data. This will be kept on a password protected memory stick and stored in a locked location, only accessible to the researcher. It will remain in this location for ten years at which point it will be permanently destroyed.

What will happen to the results of the research study?

The data produced will assist us to create a measure of risk or gang involvement, and assist us in considering effective early intervention support. This will be made in to a written report, which we are aiming to publish. All participants will have the opportunity to receive a copy of the research we write, so you can see how your assistance resulted in a final product. You will also be invited to a talk (where feasible) in order to hear the main findings of the research and next steps.

Who is organising and funding the research?

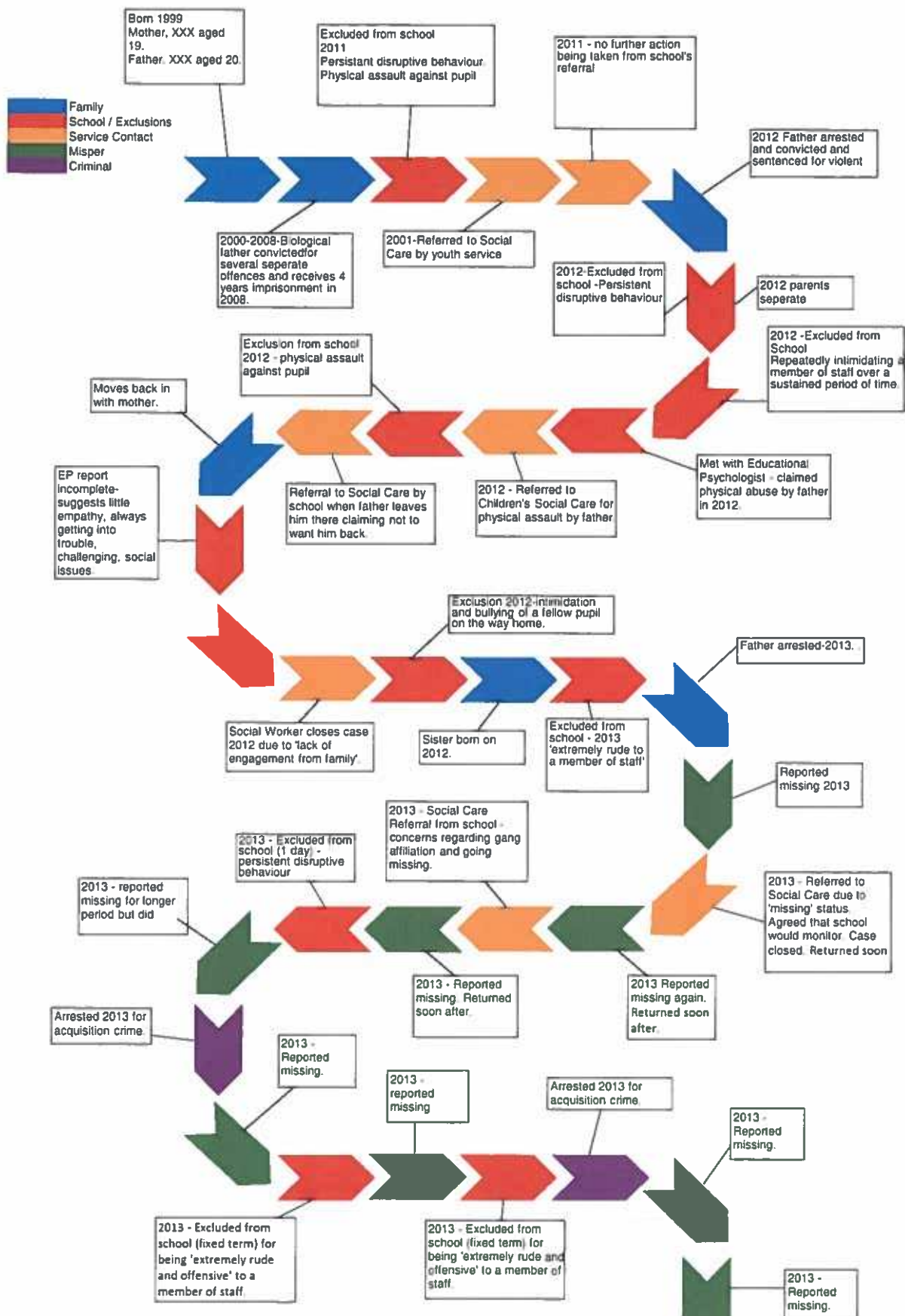
The research is organised by Canterbury Christ Church University. Additional funding has been contributed from XXXXXXXX (name of Local Authority Borough removed for safeguarding) Council.

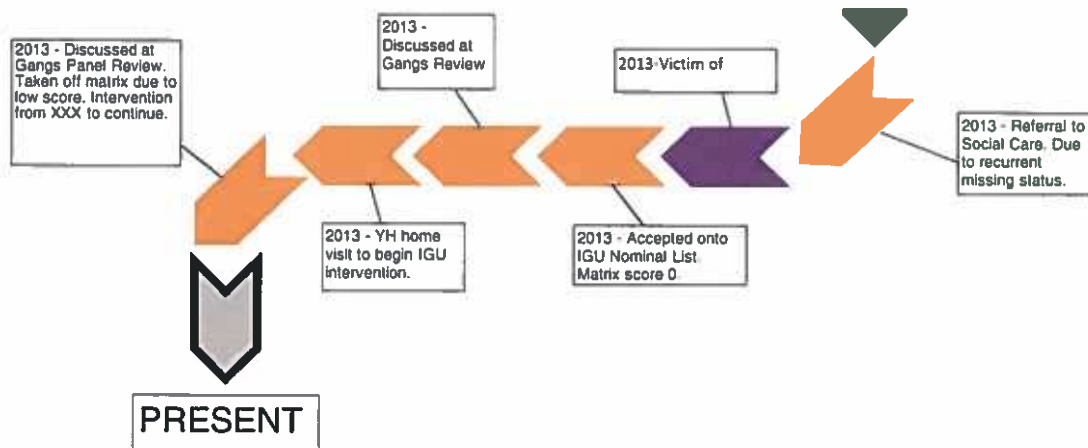
Who has reviewed the study?

This study has been reviewed and approved by Canterbury Christ Church Research Ethics Committee. This study has also been reviewed and supported by XXXXXXXX (name of Local Authority Borough removed for safeguarding) Council Ethics Board.

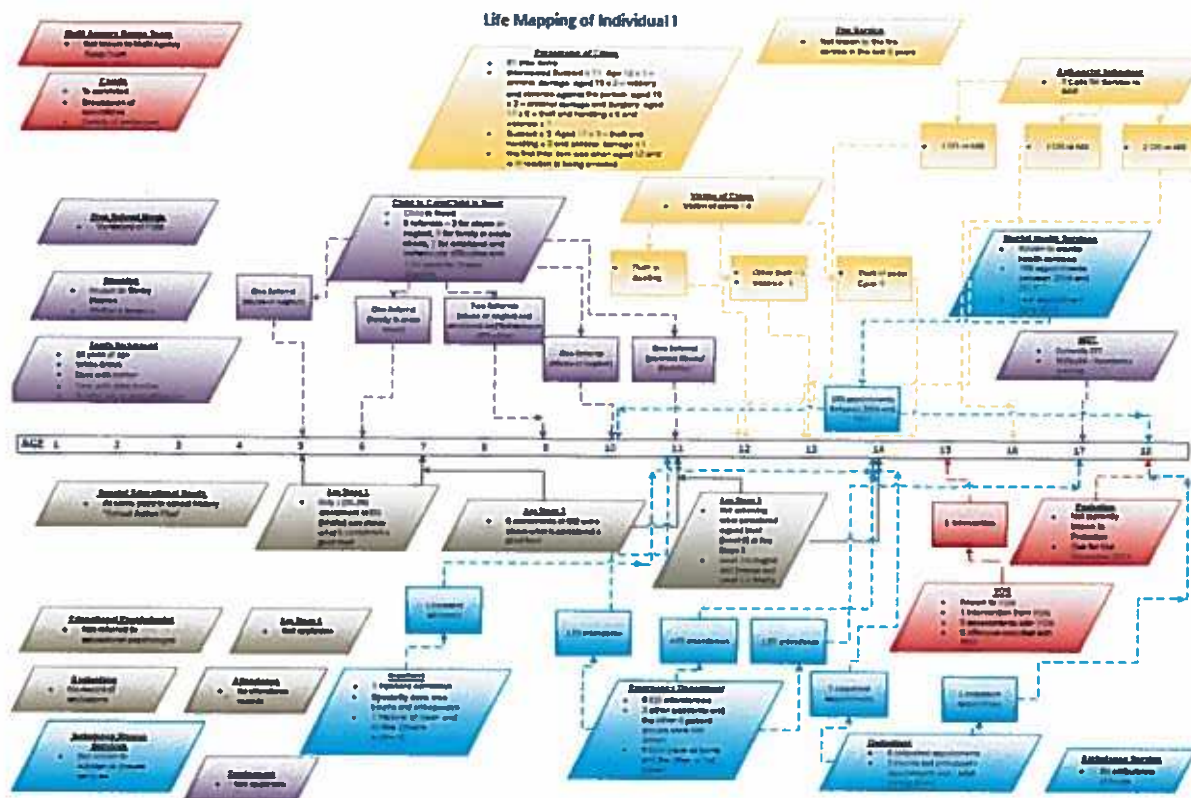
If you would like to assist us with this research then please let your youth worker/ support worker know and we will be in touch soon to organise a time to go through the questionnaire. Alternatively, please contact the research team directly on:

Appendix 7a: Tracking Maps

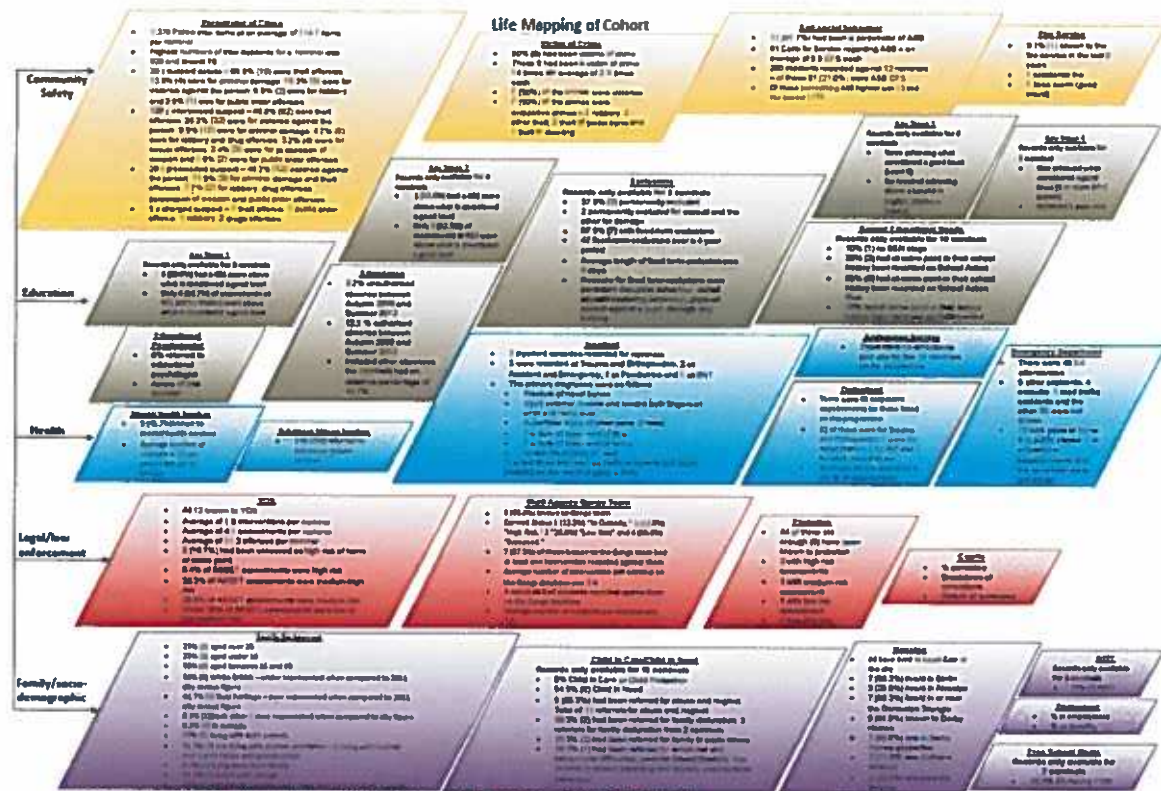




Appendix 7b: Tracking Maps

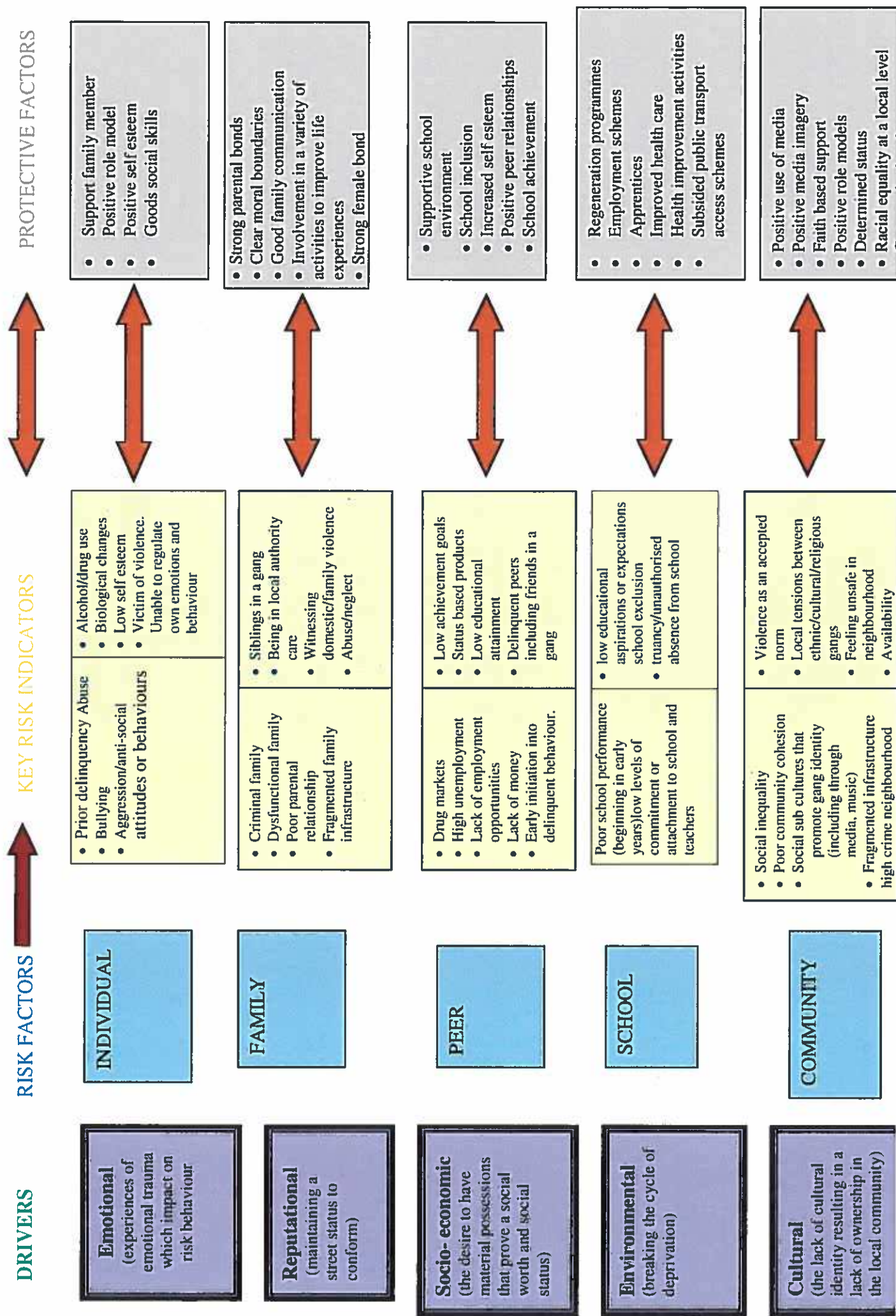


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Appendix 7d: Intelligence Tracking Map

Summary of Causal Risk and protective factors for involvement in gang violence



Appendix 8: Examples of Development of Three Mental Health Items

Risk Area?	Some DSM-V Examples	Some SQUIFA/ SIFA examples	GARM Question
Self-harm	The individual engages in self-injury expecting to get relief from a negative emotion.	<p>Do you think about harming or killing yourself?</p> <p>Have you ever made plans or tried to kill or hurt yourself? How often? What happened?</p> <p>Did you want to kill yourself? Do you still feel like this?</p>	Sometimes people hurt themselves when they feel stressed. Is this something you had done?
Depression/ Suicide/ Self-esteem	<p>Feelings of worthlessness or guilt.</p> <p>Recurrent thoughts of death or suicide.</p>	Do you feel really miserable or sad? Do you dislike yourself or your life?	<p>Did you feel good about yourself?</p> <p>Did you experience thoughts that you'd be better off dead?</p>
PTSD	Recurrent, involuntary, & intrusive distressing memories of the event.	Do you have powerful memories of past upsetting events, which make you feel unwell, scared or angry?	Did unpleasant thoughts or images come into your mind unexpectedly; related to violent things you'd seen or heard?

**Appendices 9-11 Regarding Ethics Removed for Purposes of
Data Protection**

Appendix 12: Consent Sheet

Centre Number:

Study Number:

Participant Identification Number for this study:

Title of Project:

Identification of psychological and holistic risks factors connected to gang-affiliation in the UK & development of a measure in order to appropriately target early intervention/ prevention and improve mental health outcomes

Name of Interviewer:

1. I confirm that I have read and understood the information sheet dated.....version.....for the above study. I have had the opportunity to ask questions, reflect on the responses, and consider whether I would like to be involved.
2. I understand that my participation is voluntary and that I am free to withdraw at any point, without giving any reason and without, medical care or legal rights being affected.
3. I understand that my involvement will create data, which will later be anonymised.
4. I have been given support numbers, in case this is needed following the research.
5. I have been given a complaint form in case this is needed, following the research.
6. I agree to take part in the study

Name of Participant _____ Date _____

Signature _____

Name of research assistant checking consent (to ensure that participants are deemed able to understand the nature of research and do not need parental/ LA consent):

Name of research assistant: _____ /Date _____ / Signature

Appendix 13: Help Sheet

Distress Limitation and Maintenance of Emotional Well-Being

Please let us know, did the questionnaire cause you any distress?

- ☐ Yes
- ☐ No

Please then have a short dialogue and respond to any other questions they have for you about the process and respond to any clinical needs/ concerns/ support needs/ referrals etc.

If so, please see list below of supportive organisations if you feel you would benefit from contacting them. They all offer a confidential service. If you need something they can't offer, they should be able to signpost you to somewhere that will.

- The Samaritans: 08457 90 90 90 (a national 24 hr service offering emotional support to anyone in crisis)
- CRUSE: 0870167167 (a national bereavement helpline)
- Depression Alliance: 020 7633 0557 (a national organisation helping people with depression)
- FRANK (previously the National Drugs Helpline): 0800 77 66 00
- Alcohol Concern: 020 7922 8668
- **XXX (removed)** Offers confidential counselling and support for people under the age of 25 in XXX (name of Local Authority Borough removed for safeguarding)
- City and XXXXXXXX (name of Local Authority Borough removed for safeguarding) MIND
Offers confidential counselling and support for people of all ages in XXXXXXXX (name of Local Authority Borough removed for safeguarding)
Confidential Helpline/ Local Authority helplines: **XXX (removed)**

Any complaints about this process please contact:
XXX (removed)

<p>Appendix 14 Feedback to Ethics Removed for Purposes of Data Protection</p>
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Appendix 15: Descriptive Statistics and Tests of Normality

Table 1

Results for Tests of Normality

	Valid		Missing				Median	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
	N	Percent	N	Percent	N	Mean						
Gang affiliated	56	100.0%	0	0.0%	56	6.98	6.50	3.72	.120	.32	-.751	.63
Non gang-affiliated	81	98.8%	1	1.2%	82	5.19	4.00	2.7	.54	.27	-.30	.53
Matrix gang-affiliated	46	100.0%	0	0.0%	46	9.80	10.00	3.19	-.37	.35	-.32	.69

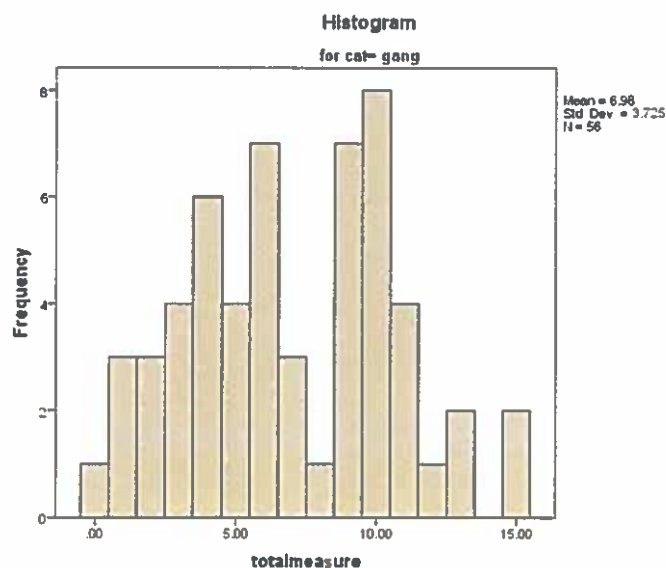


Fig. 1: Histogram for gang affiliated data

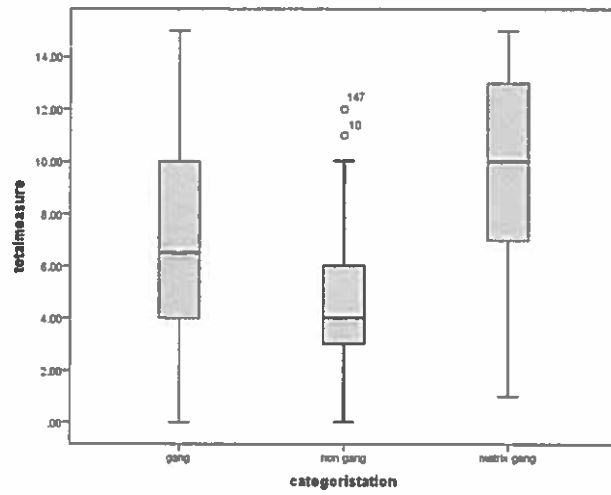


Fig. 4: Stem and leaf plot for all groups

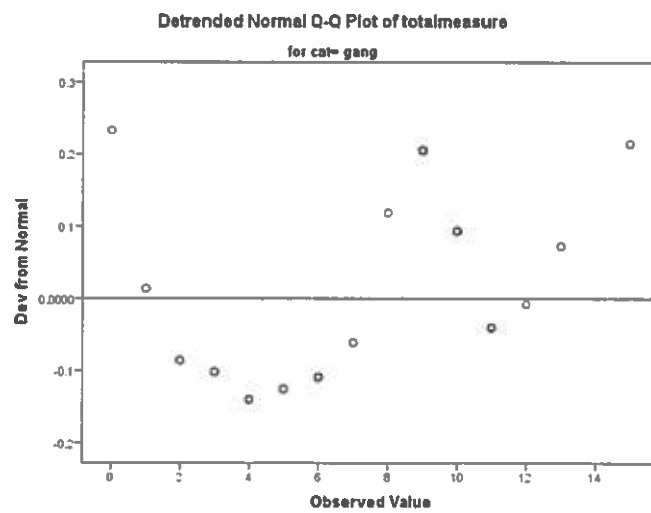


Fig. 5: Detrended normal Q-Q plot for gang affiliatedgroup

Appendix 16: Summary of Risk Areas and Questions

Item	Recommended by	Final item question	Included post analysis?	Newly worded item question post analysis
Witnessing domestic violence	All parties	Had you witnessed violence at home?	Yes	Had you witnessed violence at home?
Social modelling of problem solving using violence	All parties	Did the people who lived with you sort out problems using violence?	Yes	Did the people who lived with you sort out problems using violence?
Parental supervision	All parties	Did you usually tell your family where you were going, when you went out?	Yes	Did you usually tell your family where you were going, when you went out?
Parental supervision	All parties	When you got home from school, did anyone ask you how your day had been?	Yes	When you got home from school, did anyone ask you how your day had been?
Absence of biological father	All parties	Was your biological father living at home with you?	Yes	Was your biological father living at home with you?
Familial gang membership	All parties (except EBE)	Did you have a family member in a gang?	Yes	Did you have a family member in a gang?
Abuse	All parties	Do you think that kids should be treated how you were treated at home?	No	N/A
Physical abuse	All parties	Had you experienced harsh discipline at home?	No	N/A
Unemployed parents	All parties	Did your parents work?	No	N/A

Appendix 16: Summary of Risk Areas and Questions

Regular nightmares (PTSD)	All parties	Did you regularly have nightmares?	Yes	Did you regularly have nightmares?
Sense of foreshortened future (PTSD)	All parties	Did you have the sense that life would be short?	Yes	Did you have the sense that life would be short?
Hypervigilance (PTSD)	All parties	Was your area so hot for you that you had to look over your shoulder all the time, to stay safe?	Yes	In your area , did you feel that you had to look over your shoulder all the time, to stay safe?
Intrusive thoughts/ images (PTSD)	All parties	Did unpleasant thoughts or images come into your mind unexpectedly; related to violent things you'd seen or heard?	Yes	Did unpleasant thoughts or images come into your mind unexpectedly; related to violent things you'd seen or heard?
Sense of foreshortened future (PTSD)	All parties	Could you imagine yourself growing old?	No	N/A
Low self-esteem	All parties (EBE unsure)	Did you feel good about yourself?	No	N/A
Low self-esteem/ social status	All parties	Did you feel people respected you?	No	N/A
Externalising (CD)	All parties	When things went wrong in life, would you blame others?	No	N/A
Anxiety	All parties	Did you worry a lot about things before you did them?	No	N/A

Appendix 16: Summary of Risk Areas and Questions

Self-harm	All parties	Sometimes people hurt themselves when they feel stressed. Is this something you had done?	No	N/A
Need/ access to counselling	All parties	Had you been able to talk to someone about your feelings, like a counsellor or psychologist?	No	N/A

Appendix 17: Results of Analysis Following Removal of Pilot Data

Table 1

Results of ROC Analysis Without Pilot Data (matrix SG compared to CG)

Categorisation	N	Area Under the Curve	Std. Error ^a	Asymptotic Sig. ^b	Asymptotic 95% Confidence Interval	
Matrix gang affiliated	45	.90	.028	.00	.85	.95
Non gang affiliated	61					
Missing	1					

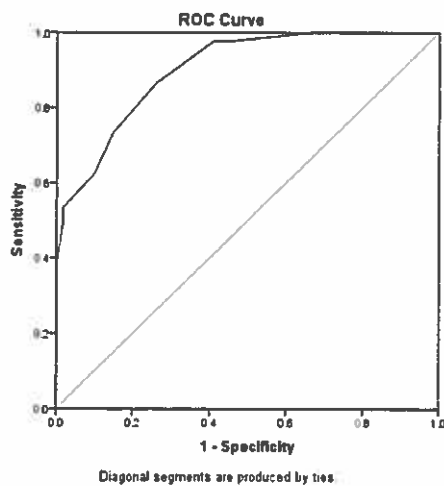


Fig. 1: Results of ROC analysis without pilot data (matrix SG compared to CG)

Table 2

Results of ROC Analysis Without Pilot Data (total SG compared to CG)

Categorisation	N	Area Under the Curve	Std. Error ^a	Asymptotic Sig. ^b	Asymptotic 95% Confidence Interval	
Gang-affiliated	89	.85	.03	.00	.79	.91
Not gang affiliated	61					
Missing	39					

Appendix 18: CATPCA Output for the Remaining 13 items when Factor 1 Removed

Risk Area	Component Loadings												
	Dimension												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Parental supervision from parent	.475	-.016	.448	.416	-.182	.173	.285	.029	.163	-.134	-.438	-.139	.009
Presence of biological father	.464	.179	-.115	-.233	-.050	.614	.093	-.270	.286	-.238	.270	.006	.112
Familial gang membership	-.502	-.192	-.078	.275	-.143	-.385	.382	-.143	.417	-.193	.262	-.068	-.100
Mother under 20 when they were born	-.193	.379	-.111	.555	.429	.042	-.161	-.371	.172	.293	-.053	.073	.161
Awareness of post code gangs in community	-.303	.244	.370	-.047	-.548	.051	-.524	-.099	.267	.148	.023	.003	-.170
Presence of fear in community	-.389	.641	-.109	-.049	-.079	.077	.270	-.272	-.287	-.205	-.158	.191	-.282
Avoidance in community related to violence	-.343	.593	.437	-.264	-.074	-.191	.237	.080	-.068	.045	.097	-.137	.366
Lack of safe spaces in community	-.217	-.114	.656	-.028	.613	.131	-.090	-.026	-.050	-.174	.171	-.106	-.214
Perpetrator of violent assault	-.486	-.569	.286	.044	-.156	.112	-.018	-.238	-.141	-.155	-.050	.400	.240
Regular nightmares	-.452	.280	-.149	.246	.090	.201	-.155	.631	.174	-.318	-.015	.170	.061
Lack of ability to self-regulate after angry episode	-.526	-.152	-.122	.388	-.257	.422	.040	.021	-.365	.093	.172	-.343	.017
Thoughts or behaviour controlled by something other than yourself	-.505	-.168	.019	-.300	.104	.343	.374	.170	.249	.484	-.121	.093	-.098

Appendix 19a: Results of Categorical Principal Components Analysis

Table 1
 Model Summary for CatPCA on 26 Items

Dimension	Cronbach's Alpha	Variance Accounted For		Loss		Loss	
		Total (Eigenvalue)		Total	Centroid Coordinates	Restriction of Centroid to Vector Coordinates	Loss
1	.873	6.232		26.024791	649.971567		.003642
2	.500	1.924					
3	.391	1.603					
4	.260	1.333					
5	.189	1.222					
6	.141	1.157					
7	.079	1.082					
8	-.003	.997					
9	-.024	.978					
10	-.061	.944					
11	-.170	.859					
12	-.280	.788					
13	-.346	.751					
14	-.454	.696					
15	-.521	.666					
16	-.703	.597					
17	-.813	.561					
18	-.917	.531					

mother under 20 when they were born	.168	.088	.338	.167	.517	.340	-.265	-.331	.292	.185	-.018	-.099	-.009	.208	.057	.014	.132	.143	.010	.023	.122	.094	.005	-.063	.079	.107
suspension or exclusion from school	.525	-.311	-.216	-.048	.149	-.047	.085	-.217	.197	.182	-.136	-.185	.494	-.109	.007	-.037	-.071	.122	-.114	-.014	-.093	-.143	.127	-.018	-.165	-.115
awareness of post code gangs in community	.328	.163	-.242	-.430	.396	.078	.327	.345	.046	.013	.057	-.065	-.111	.159	.234	-.019	.247	.037	.134	-.112	.050	-.019	.020	.140	-.125	-.040
witnessed community violence	.540	.003	-.208	-.420	.218	.025	.110	-.044	-.039	-.029	-.201	-.261	-.209	-.015	-.317	-.253	-.104	-.086	.019	.130	-.134	-.037	.047	-.086	.192	.080
perception of ease of financial gain in comparison to gaining employment	.637	-.130	-.267	-.283	-.029	.058	.056	-.103	-.028	.022	-.158	.279	.007	.013	-.056	.323	.123	-.037	-.021	.231	.192	-.005	-.197	-.209	-.008	-.089
presence of fear in community	.413	.494	.326	.026	.109	-.085	.105	-.224	.130	-.319	.061	.132	.060	-.244	.041	.095	.106	-.055	.104	.264	-.061	-.173	.105	.190	.081	-.050
perception of comparative poverty (to peers)	.458	.271	.009	.126	-.399	.144	.184	-.263	-.328	.167	.146	-.215	.071	.156	-.060	-.109	.045	-.017	.286	-.033	.226	-.169	.056	-.052	-.037	.020
avoidance in community related to violence	.347	.582	-.003	-.169	-.018	.187	-.034	.209	.071	-.358	-.121	.024	.278	.039	.073	.083	-.306	.044	-.100	-.199	.123	-.066	-.027	-.088	.043	.143
lack of safe spaces in community	.144	.044	-.308	.106	-.229	.762	-.191	.052	.195	-.024	-.047	.148	-.230	-.118	-.133	-.026	-.050	.101	.065	.005	-.112	-.070	.045	.078	-.117	-.066
regular hearing of community violence	.590	.175	-.147	-.096	-.036	-.040	.018	-.047	-.115	.207	.452	.100	.058	.276	-.230	.167	-.078	.181	-.226	.014	-.136	.014	-.054	.186	.082	.022
victim of violent assault	.629	-.010	.086	-.085	.095	-.071	-.337	-.071	-.072	.250	.066	-.006	-.224	-.112	.349	-.132	-.218	-.108	-.071	-.054	.021	-.245	-.214	.050	.029	-.084
perpetrator of violent assault	.389	-.388	-.508	.202	-.047	.110	.063	-.087	-.010	-.209	.271	.056	.117	-.142	.283	-.060	.192	.027	.052	-.076	-.121	-.020	-.037	-.087	.204	.156
frequent aggressive thoughts	.644	-.002	-.077	.355	.114	.003	.294	-.027	-.094	-.062	-.165	.039	.053	-.155	-.036	-.236	-.143	.156	.037	.057	.143	.274	.226	.180	-.010	-.028
regular nightmares	.426	.133	.200	.418	.110	.034	.163	.363	.014	.364	-.234	.168	.118	-.053	.196	.052	.177	.149	.027	-.170	-.118	-.158	-.075	-.028	.109	.023
sense of foreshortened future	.611	-.028	.049	-.126	-.148	-.339	-.168	.126	.042	.244	-.122	.091	-.134	.190	.062	.160	-.089	.355	.284	-.009	-.031	.061	.141	-.023	-.002	.146
hypervigilance	.637	.313	.045	-.158	.014	-.058	-.153	-.158	.155	.032	.255	.046	.093	-.114	-.087	-.027	-.003	-.299	.188	-.173	-.160	.290	-.056	-.106	-.125	-.048
intrusive thoughts and images of violence	.632	.249	-.038	.193	-.108	.067	-.011	.304	-.053	.192	.060	.071	.013	.062	.242	-.166	-.015	-.127	-.218	.307	.021	.144	.249	-.109	-.029	.012
anxiety	.526	.399	.071	.142	-.132	-.135	-.046	-.148	-.200	-.218	-.184	-.193	-.231	-.026	.032	-.001	.285	.217	-.259	-.138	-.150	.014	-.044	-.121	-.094	-.062

regular hearing of community violence	.567	-.303	-.210	-.084	.151	-.156	-.472	-.136	-.230	.267	.227	.242	-.036	-.109	-.029
victim of violent assault	.636	-.054	-.267	-.219	-.096	.306	-.025	-.061	.235	-.406	.176	.270	-.069	.184	.070
perpetrator of violent assault	.427	-.119	.646	-.269	.054	-.320	-.151	-.091	.220	-.213	-.092	.073	.253	-.084	-.036
frequent aggressive thoughts	.585	-.066	.292	-.036	.149	.254	-.186	.578	.047	.141	-.236	.069	-.166	.055	.004
sense of foreshortened future	.626	-.044	-.331	-.206	.085	.147	.219	.044	.423	.313	.068	-.115	.195	-.185	-.101
hypervigilance	.599	-.251	-.383	-.155	.119	-.051	-.186	.087	-.232	-.295	-.154	-.420	.098	.028	-.017

Note: Please see Appendix 24b and 24c for data pertaining to variance across 26 items and 15 items accordingly.

Appendix 19b: CatPCA Variance Data

	Centred Coordinates																	
	Dimensions																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
witnessed domestic violence	0.22	0.194	0.205	0.001	0	0.032	0.034	0.007	0.039	0.009	0.007	0.007	0.001	0.004	0.004	0.024	0.004	0.017
social modelling of problem solving using violence	0.277	0.158	0.225	0.008	0.003	0.031	0.023	0.003	0.016	0.016	0	0	0	0.004	0.004	0.007	0.013	0.005
lack of parental supervision expectation from young person	0.377	0.107	0.017	0.042	0.044	0.001	0	0.015	0.033	0	0	0.014	0.013	0.026	0.034	0.004	0.023	0.02
parental supervision from parent presence of biological father	0.134	0.064	0.172	0.007	0.032	0.004	0.008	0.111	0.128	0.034	0.038	0.002	0.007	0.004	0.018	0.072	0.013	0.023
familial gang membership	0.177	0.073	0.021	0.017	0.048	0.043	0.132	0.004	0.05	0.073	0.028	0.164	0.002	0.126	0.007	0.078	0	0.031
mother under 20 when they were born	0.023	0.008	0.114	0.028	0.263	0.114	0.07	0.109	0.083	0.034	0	0.01	0	0.043	0.003	0	0.017	0.001
suspension or exclusion from school	0.376	0.097	0.047	0.002	0.022	0.002	0.007	0.047	0.039	0.033	0.019	0.034	0.244	0.012	0	0.001	0.004	0.013
awareness of gang in community	0.107	0.028	0.038	0.181	0.137	0.004	0.107	0.119	0.002	0	0.003	0.004	0.012	0.023	0.015	0	0.041	0.004
witnessed community violence	0.292	0	0.043	0.174	0.047	0.001	0.012	0.002	0.002	0.001	0.041	0.068	0.044	0	0.003	0.044	0.013	0.007
perception of ease of financial gain in comparison to gaining employment	0.405	0.017	0.072	0.04	0.001	0.003	0.003	0.011	0.001	0	0.023	0.078	0	0	0.003	0.104	0.015	0.001
presence of fear in community	0.171	0.344	0.104	0.001	0.012	0.007	0.014	0.05	0.017	0.102	0.004	0.017	0.004	0.04	0.002	0.004	0.031	0.003
perception of comparative poverty (to peers)	0.204	0.073	0	0.018	0.139	0.021	0.034	0.064	0.107	0.028	0.021	0.044	0.002	0.014	0.004	0.012	0.002	0
avoidance in community related to violence	0.121	0.339	0	0.029	0	0.033	0.001	0.044	0.003	0.128	0.015	0.001	0.072	0.002	0.004	0.007	0.094	0.002
lack of safe spaces in community	0.021	0.002	0.093	0.011	0.052	0.381	0.034	0.003	0.038	0.001	0.002	0.022	0.053	0.014	0.018	0.001	0.003	0.004
regular bearing of community violence	0.349	0.033	0.022	0.004	0.001	0.002	0	0.002	0.015	0.043	0.303	0.011	0.003	0.076	0.013	0.028	0.004	0.013
victim of violent assault	0.393	0	0.007	0.007	0.004	0.003	0.114	0.003	0.005	0.063	0.004	0	0.05	0.013	0.122	0.017	0.047	0.012
perpetrator of violent assault	0.191	0.131	0.234	0.041	0.002	0.012	0.004	0.008	0	0.044	0.073	0.003	0.014	0.02	0.04	0.004	0.017	0.004
frequent aggressive thoughts	0.414	0	0.004	0.124	0.013	0	0.084	0.001	0.004	0.004	0.027	0.001	0.003	0.024	0.001	0.034	0.002	0.004
regular nightmares	0.181	0.018	0.04	0.173	0.012	0.001	0.023	0.132	0	0.133	0.053	0.023	0.014	0.003	0.074	0.003	0.031	0.022
sense of foreshortened future	0.379	0.001	0.002	0.014	0.022	0.115	0.028	0.014	0.002	0.039	0.015	0.008	0.018	0.034	0.004	0.026	0.008	0.124
hypervigilance	0.404	0.096	0.002	0.025	0	0.003	0.024	0.023	0.024	0.001	0.043	0.002	0.004	0.013	0.008	0.001	0	0.089
intrusive thoughts and images of violence	0.4	0.062	0.001	0.037	0.042	0.004	0	0.092	0.003	0.033	0.004	0.003	0	0.004	0.018	0.027	0	0.014
anxiety	0.277	0.154	0.003	0.02	0.018	0.018	0.002	0.022	0.04	0.044	0.034	0.017	0.013	0.001	0.001	0	0.081	0.047
lack of ability to self regulate after abgry episode	0.143	0.02	0.02	0.229	0.11	0.052	0.042	0.004	0.029	0.018	0.039	0.011	0.093	0.051	0.019	0.013	0.047	0.002
thoughts or behaviour controlled by something other than yourself	0.173	0.001	0.054	0.038	0.14	0.091	0.001	0.001	0.187	0.003	0.017	0.062	0.003	0.126	0.017	0.023	0.001	0.004
Active Total	6.232	1.923	1.403	1.333	1.222	1.157	1.042	0.997	0.978	0.944	0.84	0.788	0.731	0.694	0.646	0.597	0.541	0.518

Appendix 19b: CatPCA Variance Data

(Vector Coordinates)													Total
14	13	16	17	18	19	20	21	22	23	24	25	26	
0.004	0.004	0.024	0.004	0.017	0	0.004	0.015	0	0.005	0.003	0.041	0.057	
0.004	0.004	0.007	0.013	0.004	0.003	0.003	0.002	0.01	0.02	0.003	0.04	0.074	
0.024	0.014	0.004	0.023	0.02	0.044	0.047	0.074	0	0.023	0.022	0	0.011	
0.004	0.014	0.072	0.013	0.024	0.002	0.014	0	0.011	0.07	0.004	0.003	0	
0.023	0.017	0.034	0.014	0.003	0.001	0.004	0.012	0.002	0	0.014	0	0.001	
0.124	0.007	0.014	0	0.004	0.013	0.003	0	0.003	0.012	0.001	0.005	0	1.004
0.043	0.003	0	0.013	0.001	0	0.001	0.014	0.004	0	0.014	0.004	0.012	
0.012	0	0.001	0.002	0.013	0.013	0	0.004	0.02	0.014	0	0.027	0.013	1.004
0.023	0.014	0	0.041	0.001	0.013	0.013	0.002	0	0	0.02	0.014	0.002	
0	0.001	0.044	0.011	0.007	0	0.017	0.014	0.004	0.002	0.007	0.017	0.004	
0	0.003	0.044	0.014	0.001	0	0.014	0.017	0	0.014	0.044	0	0.004	1.004
0.04	0.002	0.004	0.011	0.007	0.011	0.07	0.004	0.07	0.011	0.034	0.004	0.002	
0.024	0.004	0.012	0.002	0	0.002	0.011	0.011	0.024	0.003	0.003	0.004	0	1.004
0.002	0.003	0.007	0.004	0.002	0.01	0.04	0.015	0.004	0.001	0.004	0.002	0.07	1.007
0.014	0.014	0.001	0.007	0.01	0.04	0.04	0.015	0.004	0.002	0.004	0.014	0.004	1.007
0.074	0.023	0.024	0.004	0.013	0.011	0	0.014	0	0.003	0.015	0.007	0	
0.013	0.12	0.017	0.047	0.012	0.004	0.003	0	0.04	0.044	0.003	0.001	0.007	
0.02	0.04	0.004	0.017	0.001	0.007	0.004	0.015	0	0.001	0.004	0.042	0.024	1.004
0.024	0.001	0.034	0.02	0.024	0.001	0.003	0.02	0.015	0.011	0.012	0	0.001	1.004
0.003	0.034	0.001	0.014	0.022	0.001	0.024	0.014	0.024	0.004	0.001	0.012	0.001	
0.034	0.004	0.024	0.004	0.124	0.001	0	0.001	0.004	0.02	0.001	0	0.002	1.004
0.013	0.004	0.001	0	0.004	0.015	0.07	0.024	0.044	0.003	0.011	0.014	0.002	1.004
0.004	0.014	0.017	0	0.014	0.042	0.094	0	0.024	0.002	0.012	0.001	0	1.004
0.001	0.001	0	0.001	0.042	0.007	0.004	0.023	0	0.002	0.015	0.004	0.004	1.004
0.001	0.014	0.013	0.041	0.002	0	0.002	0.012	0.01	0.007	0.017	0.011	0	1.004
0.124	0.017	0.023	0.001	0.013	0.005	0.001	0.003	0.002	0.002	0.014	0.004	0.001	
0.004	0.004	0.07	0.041	0.011	0.014	0.042	0.014	0.004	0.047	0.011	0.002	0.023	16.025

Appendix 19c: CatPCA Variance data on 15 items

	Centroid C							
	Dimension							
	1	2	3	4	5	6	7	8
witnessed domestic violence	0.29	0.319	0.026	0.07	0.015	0.054	0.037	0.013
social modelling of problem solving using violence	0.353	0.347	0.002	0.063	0.003	0.003	0.037	0.001
lack of parental supervision expectation from young person	0.469	0.056	0.002	0	0.075	0.011	0.071	0.042
parental supervision from parent	0.17	0.246	0.083	0.002	0	0.332	0.018	0.067
presence of biological father	0.16	0	0.004	0.19	0.569	0.001	0.001	0.003
suspension or exclusion from school	0.349	0.015	0.156	0.012	0.02	0	0.114	0.01
awareness of post code gangs in community	0.121	0.2	0.001	0.34	0.077	0.078	0.007	0.005
witnessed community violence	0.34	0.102	0.001	0.141	0.041	0.011	0.088	0.013
perception of ease of financial gain in comparison to gaining employment	0.462	0.048	0.017	0.015	0.016	0.002	0.006	0.169
regular hearing of community violence	0.321	0.092	0.044	0.007	0.023	0.024	0.223	0.018
victim of violent assault	0.404	0.003	0.071	0.048	0.009	0.094	0.001	0.004
perpetrator of violent assault	0.182	0.014	0.417	0.073	0.003	0.103	0.023	0.008
frequent aggressive thoughts	0.343	0.004	0.085	0.001	0.022	0.065	0.035	0.334
sense of foreshortened future	0.391	0.002	0.109	0.043	0.007	0.022	0.048	0.002
hypervigilance	0.356	0.063	0.146	0.024	0.014	0.003	0.035	0.008
Active Total	4.712	1.532	1.166	1.028	0.896	0.802	0.742	0.696

Appendix 19c: CatPCA Variance data on 15 items

Total (Vector Coordinates)									
Dimension									
2	3	4	5	6	7	8	9	10	
0.339	0.026	0.07	0.015	0.054	0.037	0.013	0.006	0	
0.347	0.002	0.063	0.003	0.003	0.037	0.001	0.002	0	
0.056	0.002	0	0.075	0.011	0.071	0.042	0.005	0.022	
0.246	0.083	0.002	0	0.332	0.018	0.067	0	0.004	
0	0.004	0.19	0.569	0.001	0.001	0.003	0.015	0.02	
0.015	0.156	0.012	0.02	0	0.114	0.01	0.043	0	
0.2	0.001	0.34	0.077	0.078	0.007	0.005	0.103	0.006	
0.102	0.001	0.141	0.041	0.011	0.088	0.013	0.092	0.002	
0.048	0.017	0.015	0.016	0.002	0.006	0.169	0.002	0.068	
0.092	0.044	0.007	0.023	0.024	0.223	0.018	0.053	0.071	
0.003	0.071	0.048	0.009	0.094	0.001	0.004	0.055	0.165	
0.014	0.417	0.073	0.003	0.103	0.023	0.008	0.048	0.045	
0.004	0.085	0.001	0.022	0.065	0.035	0.334	0.002	0.02	
0.002	0.109	0.043	0.007	0.022	0.048	0.002	0.179	0.098	
0.063	0.146	0.024	0.014	0.003	0.035	0.008	0.054	0.087	
1.532	1.166	1.028	0.896	0.802	0.742	0.696	0.659	0.609	

Appendix 20: Local Expert Meeting Notes on the Inclusion or Exclusion of Items for GARM, Based on the Identified Construct (historic lack of safety and current perception of threat)

Item Number	Area of Risk	Decision	Reasoning
4	Lack of parental supervision (B)	Include	<p>If parents aren't enquiring about the young person's day/ peer group/ whereabouts, it increases the risk of them not picking up on cues relating to gang-recruitment leaving them at risk. Additionally, they will likely be less protected from risk exposure in the community (perhaps enhancing their level of threat perception), and parents would be less likely to pick up on gang activity once involved.</p> <p>Furthermore, parental relationships with young people and parental lack of interest in the experiences of the young person have wider reaching risks relating to emotional vulnerability/ emotional neglect (e.g. needing to belong to a group) and would indicate a historic lack of emotional safety and/ or protection. Lack of parental supervision is well documented as associated with gang-affiliation in wider literature (Raby & Jones, submitted for publication).</p>
5	Absence of biological father	Include	<p>Frontline practitioner experiences (and the experiences of some experts by experience) were that fathers in this cohort had at times been violent and then relationships broke down (which would fit with this cohorts experiences of domestic violence) indicating that this might link in with historic risk exposure (although it is acknowledged that fathers might be absent for other reasons).</p> <p>Same as above, this relates to male role models, but also that it would inherently leave the young person's mum as the single parent which stretches her capacity to supervise the young person, more than it would with two parents able to supervise offering similar risks as suggested above.</p> <p>Theory supports that being in single-parent households with no positive male role model was associated with gang affiliation (Raby & Jones, submitted for publication).</p>
9	Awareness of post code gangs	Include	<p>Communities with highly visible gang presence presented as an associative risk of gang affiliation in gang-related literature (Raby& Jones, submitted for publication).</p> <p>Awareness of gang presence would likely heighten threat perception, and knowledge that this was a potential route of safety seeking (to join a gang) which those with a historic risk exposure presentation would be more at risk of.</p>
18	Perpetrator of violent assault	Include	<p>Those who had historically been victims of violence were likely to have an increased threat perception, potentially perceive a more neutral event to be hostile and also react violently. This fits with the wider literature. Research assistants fed-back that in all of their interviews, qualitative</p>

Appendix 21: Cronbach's Alpha Results

Table 1
Cronbach's α for all items across CatPCA Dimensions

Dimension	Model Summary	
	Cronbach's Alpha	Eigenvalue
1	.873	6.232
2	.500	1.924
3	.391	1.603
4	.260	1.333
5	.189	1.222
6	.141	1.157
7	.079	1.082

Table 2

Cronbach's α for all Items with Loading Value of $\geq .45$ Retained

	Mean	Std. Deviation	N	Cronbach's Alpha	Number of Items
Frequent aggressive thoughts	1.54	.499	184	.78	14
Hypervigilance	1.57	.496	184		
Perception of ease of Financial gain in comparison to gaining employment	1.57	.496	184		
intrusive thoughts and images of violence	1.64	.482	184		
Victim of violent assault	1.73	.443	184		
Lack of parental supervision expectation from young person	1.34	.474	184		
Sense of foreshortened future	1.71	.454	184		
Regular hearing of community violence	1.27	.443	184		
Witnessed community violence	1.24	.431	184		
Social modelling of problem solving using violence	1.79	.410	184		
anxiety	1.63	.485	184		
Suspension or exclusion from school	1.48	.501	184		
Witnessed domestic violence	1.78	.414	184		
Perception of comparative poverty (to peers)	1.55	.499	184		

Table 3
Cronbach's Alpha Results Across 15 Items

Dimension	Cronbach's Alpha	Variance Accounted For
		Total (Eigenvalue)
1	.84	4.71
2	.37	1.53
3	.15	1.17
4	.03	1.03
5	-.12	.90
6	-.27	.80
7	-.372	.74
8	-.47	.70
9	-.55	.660
10	-.69	.610
11	-.81	.59
12	-1.15	.48
13	-1.53	.41
14	-1.57	.41
15	-2.45	.30
Total	1.00 ^a	15.02

a. Total Cronbach's Alpha is based on the total Eigenvalue.

Table 4
Cronbach's Alpha Results Across 18 Items

Dimension	Cronbach's Alpha	Variance Accounted For
		Total (Eigenvalue)
1	.86	4.71
2	.41	1.53
3	.26	1.17
4	.11	1.03
5	.01	.90
6	-.11	.80
7	-.21	.74
8	-.34	.70
9	-.43	.66
10	-.57	.61
11	-.68	.59
12	-.90	.48
13	-.98	.41
14	-1.05	.41
15	-1.26	.30
Total	-1.57	15.02

a. Total Cronbach's Alpha is based on the total Eigenvalue.

Appendix 22: Results of Differential Tests

Table 1

Results of Mann Whitney U Test Comparing GARM scores Between Gang-affiliated and Non Gang-affiliated Groups

Category	N	Mean rank	Sum of ranks	Mann-Whitney U	Mean score	Z-score	Asymp. Sig. (2-tailed)
Gang-affiliated	102	114.54	11683.00	1832.000	8.25	-6.484	.000
Non gang-affiliated	81	63.62	5153.00		4.59		
Total	183						

Table 2

Results of Mann Whitney U Test Comparing GARM scores Between Self-reporting Gang-affiliated and Non Gang-affiliated Groups

Category	N	Mean rank	Sum of ranks	Mann-Whitney U	Mean score	Z-score	Asymp. Sig. (2-tailed)
Self-reporting gang-affiliated	56	84.40	4726.50	1405.50	6.98	-3.80	.000
Non gang-affiliated	81	63.62	5153.00		4.59		
Total	137						

Table 3

Results of Mann Whitney U Test Comparing GARM scores Between Matrix Gang-affiliated and Non Gang-affiliated Groups

Category	N	Mean rank	Sum of ranks	Mann-Whitney U	Mean score	Z-score	Asymp. Sig. (2-tailed)
Matrix gang-affiliated	46	95.23	4380.50	671.00	9.80	-7.24	.00
Non gang-affiliated	81	46.27	3747.50		4.59		
Total	137						

Table 4

Results of Mann-Whitney U Test Comparing GJRM scores Between Self-reporting Gang-affiliated and Matrix Gang-affiliated Groups

Category	N	Mean rank	Sum of ranks	Mann-Whitney U	Mean score	Z-score	Asymp. Sig. (2-tailed)
Matrix gang-affiliated	46	63.79	2928.00	729.00	9.80	-3.77	.00
Self-reporting gang-affiliated	56	41.40	2325.00		6.98		
Total	137						

Table 5

Results of the Kruskal-Wallis Test Between Three Groups

Category	N	Mean	Mean rank	Std. Deviation	Median	Chi-Square	df	Asymp. Sig. (2-tailed)
Matrix gang-affiliated	46	9.80	135.38	3.19	10.00	55.11	2	.00
Self-reporting gang-affiliated	56	6.98	97.42	3.72	6.50			
Non gang-affiliated	81	4.59	63.62	2.70	4.00			
Total	137							

Appendix 23a: Results of Receiver Operator Curve Analysis

Table 1
ROC Curve Results (SG versus CG)

Group	N	Positive if Greater Than or Equal To ^a	Sensitivity	1 - Specificity	Area Under Curve	Standard Error	Sig.	Lower Bound	Upper Bound
SG	103	-1.0000	1.000	1.000	.780	.034	.00	.72	.85
CG	81	.5000	.990	.975					
Missing	5	1.5000	.951	.889					
		2.5000	.922	.753					
		3.5000	.883	.605					
		4.5000	.816	.420					
		5.5000	.777	.383					
		6.5000	.660	.235					
		7.5000	.573	.148					
		8.5000	.515	.111					
		9.5000	.408	.037					
		10.5000	.311	.025					
		11.5000	.223	.012					
		12.5000	.165	.000					
		13.5000	.078	.000					
		14.5000	.039	.000					
		16.0000	.000	.000					

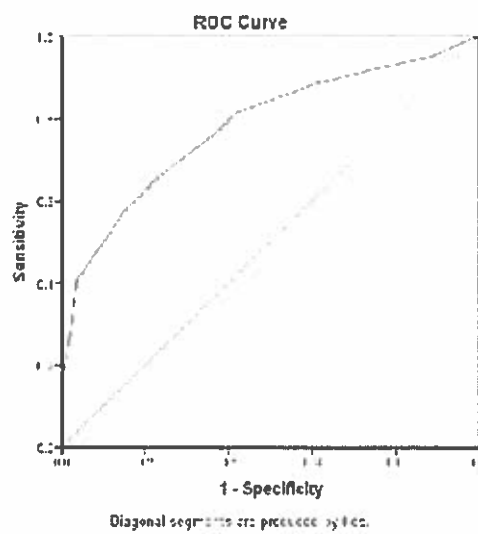


Fig 1: ROC results for SG and CG data

Table 2
ROC Curve Results (SG versus CG)

Group	N	Positive if Greater Than or Equal To ^a	Sensitivity	1 - Specificity	Area Under Curve	Standard Error	Sig.	Lower Bound	Upper Bound
SG	46	-1.0000	1.000	1.000	.89	.03	.00	.83	.95
CG	81	.5000	1.000	.975					
Missing	1	1.5000	.978	.889					
		2.5000	.978	.753					
		3.5000	.978	.605					
		4.5000	.957	.420					
		5.5000	.957	.383					
		6.5000	.848	.235					
		7.5000	.717	.148					
		8.5000	.609	.111					
		9.5000	.522	.037					
		10.5000	.478	.025					
		11.5000	.370	.012					
		12.5000	.261	.000					
		13.5000	.109	.000					
		14.5000	.043	.000					
		16.0000	.000	.000					

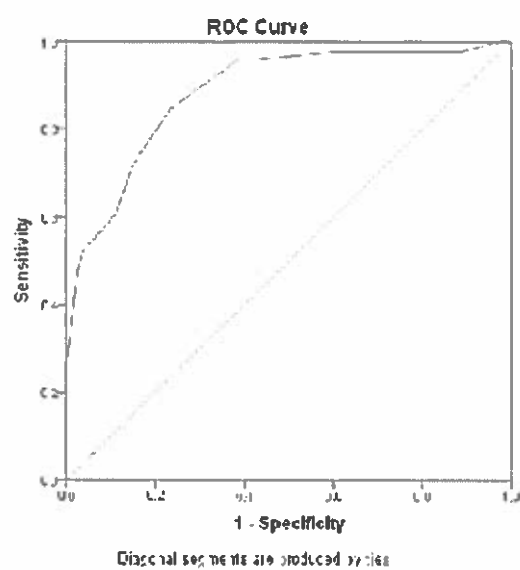


Fig 2: ROC results for matrix SG and CG data

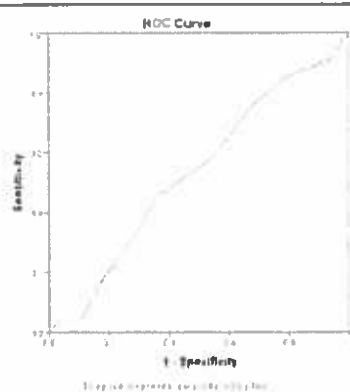
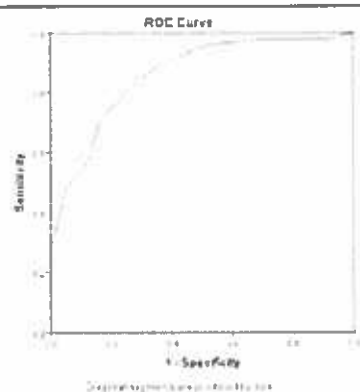
Appendix 23b: ROC Analysis on only 11 Items

Table 1
ROC Output for Matrix Gang-affiliated versus Non Gang-affiliated on 11 items

Category	N	Std. Error	AUC	Asymptotic Sig.	Asymptotic 95% Confidence Interval	
Matrix gang-affiliated	46	.03	.858	.000	Lower Bound	Upper Bound
Non gang-affiliated	81				.791	.926

Table 2
ROC Output for Gang-affiliated versus Non gang-affiliated on 11 Items

Category	N	Std. Error	AUC	Asymptotic Sig.	Asymptotic 95% Confidence Interval	
Gang-affiliated	56	.05	.53	.48	Lower Bound	Upper Bound
Non gang-affiliated	127				.44	.62



Figures above show ROC output for matrix gang-affiliated versus gang-affiliated (far left) and gang-affiliated (when self reporting gang affiliation and matrix have been collapsed into one) versus non gang-affiliated (far right).

**Appendix 24: One Example of a Potentially Defensive Exchange Regarding Symptoms
from Raters notes**

Rater: Were there areas you'd avoid because of witnessing, experiencing or hearing about violence?

Participant: "I'm not gonna be pushed out of my area-look at me (shows biceps and puffs out chest). Do I look that I'd be pushed out ... intimidated?! I'd tool up and I'd ... like, maybe I wouldn't be coming out of that area unless I was in a box, d'ya get me? But nah I wouldn't get all anxious about it and shit. I'm not like that. I'd walk in ... head on. I don't care. So yeah, the answer to your question is 'no'. I would never avoid an area I was born in. If I start doing that ... what's next?"

Appendix 25

Submitted Both Sections (In Process of Peer Review)



Taylor & Francis
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Advice to authors on preparing a manuscript for
The Journal of Forensic Psychiatry and Psychology

NB: Please follow any specific instructions for authors provided by the Editor of the journal

Font: Times New Roman, 12 point. Use margins of at least 2.5 cm (1 inch).

Title: Bold, type the first word and proper nouns only in capital letters. Any sub-title should follow a colon and every word should be lower case (except proper nouns).

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- First-level headings (e.g. Introduction, Conclusion) should be in bold, with an initial capital for each main word.
- Second-level headings should be in bold italics, with an initial capital letter for each main word.
- Third-level headings should be in italics, with an initial capital letter for each main word.
- Fourth-level headings should also be in italics, at the beginning of a paragraph, with only the first word capitalized (except proper nouns). The text follows immediately after a full stop (full point) or other punctuation mark.

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