Psycho-sociological Investigation of Criminal Behaviour within a Prison Sample Using Retrospective Data

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Abstract: Previous research indicated a significant role of family variables (parental supervision and attachment) in the study of criminality. Social learning of criminal behaviour suggested that the intensity of criminal acts during adolescence is predicted by exposure to criminal peer groups. Based on a sample of recidivists (n = 312) incarcerated in a high-security prison, this article investigates the direct and indirect effects of parental attachment, parental supervision, and peer relations on associations with criminal friends and subsequent criminal behaviour. Two alternative models of criminal behaviour were specified and estimated in Mplus 6 with restricted maximum likelihood estimation, using structural equation modelling. Results suggest that parental attachment has a significant, positive direct effect on parental supervision and relationships with peers, and an indirect effect on associations with criminal friends via parental supervision. Results also indicate a direct negative effect of parental supervision on criminal associations and a strong, positive effect of criminal associations with criminal friends on criminal behaviour. The only indirect predictor of criminal behaviour was parental supervision via associations with criminal friends. Further implications in relation to theory and previous studies are discussed.

Keywords: recidivistic behaviour; prisoners; criminal friends; parental supervision; attachment

Introduction

In psychological and sociological research, scholars argue about the importance of family, peer relations and school environment in the development of criminal associations with delinquent peers. There are few perspectives that provide the theoretical explanation of why an individual

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engages in friendly relationships with criminal others and subsequent criminal behaviour. The following sections review the theoretical views and empirical support for control theories, social learning theory, differential association and peer rejection, and indicate how these frameworks contribute to a better understanding of the associations between criminal friends and development of criminal behaviour.

Control Theory and the Role of Family

According to social control theory (Hirschi 1969), criminal behaviour is a result of weak, or broken, bonds with society. Hirschi indicated four major elements involved in this process which include: that an individual fails to establish strong and positive attachment to parents or significant others; the individual fails to conform to conventional norms; and that there is a need for engagement in prosocial activities and beliefs in society's conventional standards (Rebellon 2002).

Furthermore, some control theorists believe that effective parenting can increase conformity to societal norms by protecting children from associations with criminal others (Sampson and Laub 1993). Children who develop a strong and enduring bond of affection directed towards parents are less likely to engage in relationships with delinquent peers because they value parental attachments and they also do not want to disappoint their relatives by any form of engagement in anti-social behaviour (Agnew 2001; Sokol-Katz, Dunham and Zimmerman 1997). However, more recent findings reported by Ingram *et al*. (2007) indicated that attachment had no direct influence on criminal association and it operates through parental supervision.

The role of parental supervision has also been reported as a significant predictor of an individual's criminal associations (Ingram *et al*. 2007; Loeber and Stouthamer-Loeber 1986; Patterson 1982; Rankin and Wells 1990; Sampson and Laub 1993) and further criminal behaviour (Boduszek, Hyland and Bourke 2012). Research suggests that parents who are interested in their child's school and after-school activities, including knowledge of their close friends, are less likely to raise 'future criminals' because they set appropriate rules, they control and monitor the child's behaviour and provide punishment when necessary. Thus, it can be suggested that appropriate parental supervision also serves as a buffer against associations with criminal friends. Studies conducted by Ingram and colleagues (2007) reported an indirect weak, but significant, effect of parental supervision on delinquency through peer associations. This finding suggests that within the population of youths, the role of parental supervision is significant in terms of monitoring the type of friends with whom adolescents are associated, independent of the level of parental attachment.

Researchers have also highlighted the importance of the interaction between parental attachment and supervision and the impact on development of criminal associations (Agnew 2001; Demuth and Brown 2004; Ingram *et al*. 2007; Mack *et al*. 2007). Individuals who did not establish a strong bond with their parents and who were not appropriately supervised, are at a greater risk of engagement in relationships with criminal

friends, which consequently leads to increased anti-social acts. Although much of the research emphasises the importance of parental attachment in controlling an individual's criminal associations, it should be indicated that previous research has also suggested an indirect relationship between parental attachment and criminality through parental supervision (Ingram *et al*. 2007; Warr 2005).

Criminal Friends

Social learning theory proposes that adolescents engage in criminal behaviour through the exposure to anti-social peers and adoption of their thinking style which is concentrated on breaking the social norms (Sutherland, Cressey and Luckenbill 1992). Although the fact that individuals who have criminal friends are more likely to become criminals has been widely supported by empirical research (Agnew 1991; Thornberry *et al*. 1994; Warr 1993, 2002; Warr and Stafford 1991), the nature of this relationship has been the subject of great debate among scholars. There are three major perspectives on the connection between criminal behaviour and criminal friends (Matsueda and Anderson 1998). First, as suggested by Gottfredson and Hirschi (1990), this association is not reliable because the cause of criminality lies in low self-control. Following this suggestion, Matsueda and Anderson (1998) argue that the association between criminality and anti-social friends is not important when considering the '*causal antecedent causal variable*' of low self-control.

A second view is based on interactional theory (Thornberry 1987) which postulates that criminal friends and criminal behaviour are mutually related. In other words, criminal behaviour influences, and is influenced by, the frequency and type of associations with criminal others (that is, association with criminal others influences criminal behaviour, and criminal behaviour influences the type of friends with whom that individual is associated) (Thornberry *et al*. 1994).

A third perspective indicates a distinct and direct effect of criminal friend associations on criminal behaviour in spite of low self-control and prior criminal conduct. Empirical investigations of these three views lead to the conclusion that relationships with criminal friends has a direct impact on criminality, even after controlling for low self-control and previous criminal behaviour (Agnew and White 1992; Cullen and Agnew 2006; Matsueda and Anderson 1998; Pratt and Cullen 2000; Warr 2002; Wright *et al*. 1999).

Peer Rejection and Criminal Associations

One of the strongest predictors of later participation in criminal behaviour is early rejection by peers (Dodge 2003; Parker and Asher 1987). In primary and secondary school, being perceived positively by one's peer group is a fundamental developmental task, usually leading to normal social and psychological development (Rubin, Bukowski and Parker 1998). On the other hand, social rejection by peers during primary school is a

significant risk factor for inappropriate behaviour in adolescence and criminality throughout the lifespan (Laird *et al.* 2001). Research has shown that peer rejection by first grade (age range 6–7 years) is significantly associated with the development of delinquent behaviour by the fourth grade (age range 9–10 years) (Cowan and Cowan 2004; Dodge and Pettit 2003; Miller-Johnson *et al.* 2002). It has also been noted that the quality of parent-child and marital relationships appear to have a significant influence on whether a child is rejected or accepted by peers early in his/her life (Cowan and Cowan 2004).

The literature provides strong evidence that peer-rejected individuals have a tendency to form associations with criminal friends (Laird *et al.* 2005). During the adolescent years, participation in delinquent groups shows a strong and consistent connection to offending, drug use, and other challenging behaviours (Laird *et al.* 2005). Therefore, it would be expected that both peer rejection and associations with criminal friends would be a strong characteristic of those displaying problematic and even criminal behaviour early in their psycho-social development.

Current Study

Previous studies have indicated direct correlations between attachment, parental control, peer relations, criminal friends and anti-social behaviour. However, what is missing in the psycho-social and criminological literature is a coherent structural model incorporating these relationships in one model of criminal behaviour. Thus, the main objective of the current study is to identify whether aspects of parental attachment have a significant direct correlation with criminal peer associations and further criminal conduct or whether they are mediated by parental supervision and peer relations. It is suggested that attachment has no direct effect on criminal associations with criminal friends and further criminal behaviour, and operates only through parental supervision. This hypothesis is tested within a sample of recidivistic prisoners using retrospective data incorporated in a single structural model.

Method

Participants and Procedure

The sample included 312 male prisoners (recidivists) incarcerated in Nowogard high-security prison in Poland. The offender sample consisted of 89 burglars and thieves, 68 violent offenders, 25 murderers, 18 drug dealers, seven addicted thieves, two sex offenders, and 103 mixed offenders. The respondents ranged in age from 20 to 66 years. The average age of participants was 33.85 years (mean = 33.85; standard deviation = 9.38). Most offenders (88.1%; n = 275) came from urban areas of Poland. There were 52.2% (n = 163) of offenders who reported having primary school education, 45.5% (n = 142) secondary school education, and 2.2% (n = 7) some college or university. There were 68.3% (n = 213) of prisoners who

indicated their marital status as single, 11.9% (n = 37) as married, 18.6% (n = 58) as divorced or separated, and 1.3% (n = 7) as widowed. The frequency of imprisonment reported by offenders ranged from once (mostly murderers) to 19 times (mean = 3.57; standard deviation = 2.48) and number of reported police arrests from one to 20 (mean = 4.85; standard deviation = 4.09).

Appropriate prison staff were instructed by the principal researcher about the procedures involved in conducting this study. Although 362 offenders volunteered to participate, due to incomplete responses, only 312 were considered for the final analysis. Participants completed anonymous self-administered, paper-and-pencil questionnaires which were compiled into a booklet along with an instruction sheet and consent form attached to the front of the booklet. Each participant was provided with a brief description of the study including the general area of interest, how to fill out the questionnaire, and the typical completion time (approximately 30 minutes). Participants were assured about the confidentiality of their participation and informed that they could withdraw from the study at any time. Participants completed the questionnaires in prison in their living units.

In relation to the sample size applied in the current study, Schreiber *et al.* (2006) has reported that although the sample size needed is affected by the normality of the data and estimation method that researchers use, the generally-agreed value is ten participants for every free parameter estimated. Although there is little consensus on the recommended sample size for structural equation modelling (Sivo *et al.* 2006), Garver and Mentzer (1999) and Hoelter (1983) proposed a 'critical sample size' of 200. In other words, as a rule of thumb, any number above 200 is understood to provide sufficient statistical power for data analysis.

Measures

The translation of the measures (The Measure of Criminal Attitudes and Associates, Peer Rejection, Parental Supervision and Parental Attachment) from English to Polish was performed by a team of Polish and English speaking researchers. First, the principal researcher translated the measures into Polish. The Polish version was then sent to the Polish Prison Service (PPS) for their approval, and an appropriate member of the PPS translated the Polish versions back into English. Both translations of measures, together with the original English versions, were then submitted to three experts who indicated appropriate changes.

The Measure of Criminal Attitudes and Associates (MCAA: Mills and Kroner 1999): is a two-part self-report measure of associations with criminal friends and criminal thinking style. For the purpose of this study, only Part A was used as Part A investigated retrospective questions while Part B reflects current attitudes toward crime and criminal behaviour. Part A of the measure intends to quantify criminal associations. Participants were asked to recall four individuals with whom they spent most of their time before their first incarceration and then answered four questions

regarding the degree of criminal involvement of their associates: (i) 'Has this person ever committed a crime?'; (ii) 'Does this person have a criminal record?'; (iii) 'Has this person ever been to jail?'; and (iv) 'Has this person tried to involve you in a crime?'. Responses were used to analyse two measures of criminal associations. The first, 'Number of Criminal Friends' was calculated by adding up the number of friends to which the participant answered 'yes' to any of question on criminal association. The second measure 'Criminal Friend Index' was calculated by assigning 1 through 4 to the percentage of time options (0–25%; 25–50%; 50–75%; 75–100%) available for each friend. That number was then multiplied by the number of 'yes' responses to the four questions of criminal association. All answers were summed as the Criminal Friend Index. The potential scores for the Criminal Friend Index ranged from 0 to 64, with higher scores indicating stronger association with criminal friends.

Peer Rejection (Mikami, Boucher and Humphreys 2005) is a seven-item inventory with a five-point Likert scale response format ranging from a positive answer (5) to a negative (1) with one reverse-scored question. Thus, the possible total score can range from a minimum of 7 to a maximum of 35, with higher scores reflecting more positive peer relations and lack of rejection. Participants were asked to indicate their relationship with school peers (sample question: 'How many students in your class did you get along with?'). In addition, they had to estimate the number of peers who respected them *versus* those who tended to pick on them (sample question: 'How many students in your class teased you, put you down, or picked on you?'). Current research has suggested an acceptable level of reliability for this measure (Cronbach's $\alpha = 0.75$).

Parental Supervision (Ingram *et al*. 2007) is a six-item retrospective instrument including questions regarding parental knowledge about a range of aspects of offenders' lives when they were of school age. These aspects included: parental knowledge of participants' close friends, friends' parents and school teacher; what they were doing with friends; who they were with when they were not at home; and what they were doing at school. Answers were based on a four-point Likert type scale ranging from 1 (knows nothing) to 4 (knows everything). Thus, total scores can range from a minimum of 6 to a maximum of 24, with higher scores indicating greater indirect parental supervision. Based on the current sample, the reliability for the entire measure (Cronbach's $\alpha = 0.83$) was acceptable.

Parental Attachment (Ingram *et al*. 2007) is an eleven-item retrospective measure of the nature of the positive and negative relationships between offenders and their parents. Prisoners were asked how often they felt each statement was true (for example, positive relationship: 'You felt you could really trust your mother/father when you were growing up'; negative relationship: 'You often felt angry toward your mother/father'). Answers were based on a four-point Likert type scale ranging from 1 (never) to 4 (always) with higher values indicating stronger parental attachment. The current research analysis reported sufficient reliability for the entire measure (Cronbach's $\alpha = 0.86$).

Recidivism and Demographic Questionnaire was provided as a standard measure in the process of data collection. The form requested information regarding respondents' age, location (urban, rural), education, relationship status, number of arrests, and type of crime. Additionally, recidivism was estimated on the frequency of continual criminal behaviour ('How many times have you been in prison or other places of detention?').

Analysis

Preliminary analysis was conducted in SPSS 19 to ensure that the data were suitable for structural equation modelling. Additionally, descriptive statistics and the Pearson product-moment correlation coefficient was analysed among scores of peer relation, parental attachment (positive and negative), parental supervision, number of arrests, number of incarcerations, number of criminal friends, and time spent with criminal friends.

Two alternative models (*Figure 1*) of criminal behaviour were specified and estimated in Mplus 6 (a special purpose statistical software package that estimates statistical models for observed and latent variables with more than one dependent variable) with restricted maximum likelihood estimation (Muthen and Muthen 1998–2010), using structural equation modelling (SEM). SEM is a broad data-analytic method for the quantification and statistical testing of theoretical constructs. The common structural equation model is a combination of two data-analytic methods: path analysis and factor analysis (FA). Path analysis is a technique of pictorially demonstrating the associations among observed variables in a path diagram. This is normally presented in a multiple regression analysis (Cohen and Cohen 1983). The benefit of path analysis is that it allows the direct, indirect and total effect of one observed variable on another to be obtained. FA is a statistical method with the aim of simplifying a complex data set by combining the set of observed variables into factors or latent variables. Latent variable (factor) refers to hypothetical or theoretical constructs which cannot be directly observed or measured. The manifestation of a specific latent variable can be observed by the use of a variety of instruments of measurement such as inventories, tests and questionnaires (Raykov and Marcoulides 2000). Thus, within the SEM method, the structural and measurement elements of analysis are estimated simultaneously. The measurement models in this research analyse the associations between the measured variables and latent variables, and the structural part of analysis determines the relationship among the latent variables (MacCallum and Austin 2000). For the purpose of the current research, three latent variables were identified: criminal behaviour (measured by the number of prison incarcerations, and number of police arrests), criminal associations with close friends (measured by the number of criminal friends, and time spent with criminal friends), and parental attachment (in order to simplify the model all items were computed into two independent indicators of attachment: positive and negative feelings towards parents).
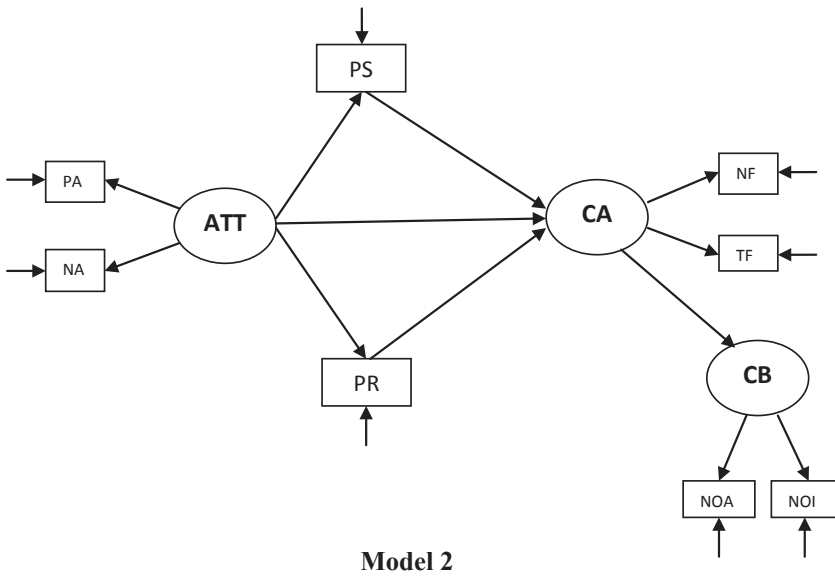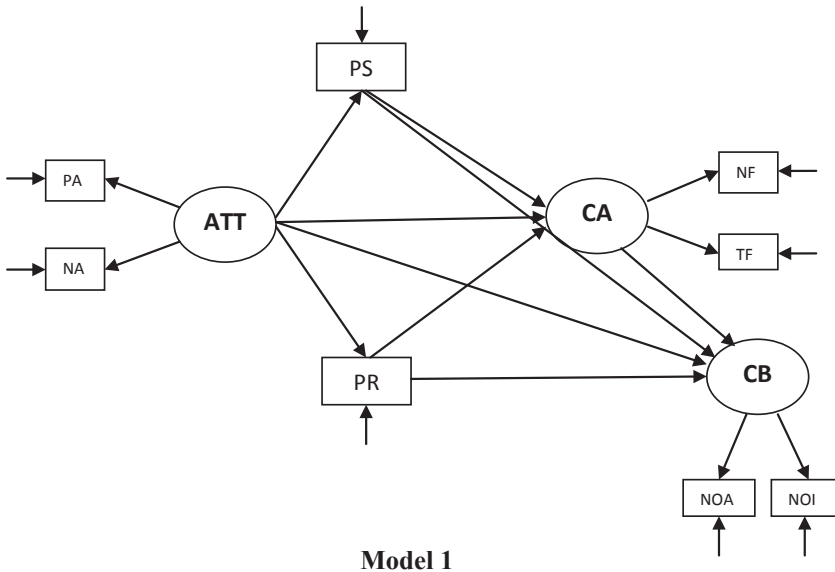
Model 1

Model 2

FIGURE 1

Two Alternative Theoretical Models of Criminal Behaviour

(*Note:* CB = criminal behaviour; CA = criminal associations; ATT = attachment; PA = positive attachment; NA = negative attachment; PS = parental supervision; PR = peer relation; NF = number of criminal friends; TF = time spent with criminal friends; NOA = number of arrests; NOI = number of incarcerations.)

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TABLE 1

Descriptive Statistics and Correlations between Parental Supervision, Parental Attachment, Peer Relations, and Criminal Associations

Variables	NOA	NOI	NF	TF	PR	PA	NA	PS
Number of arrests (NOA)	–							
Number of incarcerations (NOI)	0.68***	–						
Number of criminal friends (NF)	0.27***	0.37***	–					
Time with criminal friends (TF)	0.22***	0.23***	0.25***	–				
Peer relations (PR)	-0.09	-0.11*	-0.20***	-0.01	–			
Positive attachment (PA)	-0.08	-0.20***	-0.16**	-0.12*	0.22***	–		
Negative attachment (NA)	-0.05	-0.13*	-0.10	-0.08	0.26***	0.46***	–	
Parental supervision (PS)	-0.21***	-0.24***	-0.32***	-0.07	0.26***	0.38***	0.26***	–
Mean (m)	4.85	3.57	7.25	8.28	20.54	19.12	15.21	13.46
Standard deviation (sd)	4.09	2.48	4.60	3.11	4.98	4.22	2.32	3.52

(*Note*: statistical significance: *p < 0.05; **p < 0.01; ***p < 0.001.)

Results

Descriptive Statistics and Correlations

Descriptive statistics, including means (m) and standard deviations (sd) for the measures included in the current project, are presented in *Table 1* along with correlations between scores of peer relation, parental attachment (positive and negative), parental supervision, number of arrests, number of incarcerations, number of criminal friends, and time spent with criminal friends.

Model Testing – SEM

Testing the aims of the current research was a two-step procedure. The first step was to analyse the overall fit of model 1 (see *Figure 1*) which includes all possible direct paths from all predictors to criminal behaviour. *Table 2* presents both absolute and comparative fit indices for each model. The chi-squared statistic investigates the difference between the empirical model and the actual model. The Comparative Fit Index (CFI: Bentler 1990) and the Tucker Lewis Index (TLI: Tucker and Lewis 1973) are measures of how much better the model fits the data compared with one where no relationships exits. For these indices, values above 0.95 indicate a good fit (Bentler 1990; Hu and Bentler 1999). In addition, two more absolute indices are presented; the root-mean-square residual (SRMR) and the root-mean-square error of approximation (RMSEA). These indices measure the average difference between the null and alternate models per element of the variance-covariance matrix and thus give relatively different information from the other indices. Ideally, these indices should be less than 0.05 however; values less than 0.08 suggest adequate fit (Bentler 1990; Hu and Bentler 1999). Furthermore, the Akaike Information Criterion (AIC: Akaike 1974) was used to evaluate two alternative models, with the smaller value demonstrating the best fitting model.

TABLE 2

Fit Indices for two Structural Equation Models of Criminal Behaviour

Item	Model 1	Model 2
X^2	27.35	26.67
df	13	16
p	0.01	0.05
RMSEA	0.060	0.047
90% CI	0.028 0.092	0.007 0.077
SRMR	0.034	0.033
AIC	12578.077	12573.248
CFI	0.96	0.97
TLI	0.91	0.95

(*Note*: RMSEA = root-mean-square error of approximation; CI = confidence interval; SRMR = standardised root-mean-square residual; AIC = Akaike Information Criterion; CFI = Comparative Fit Index; TLI = Tucker Lewis Index.)

The fit of the proposed model 1 was not satisfactory ($\chi2$ = 27.35, df = 13, p = 0.01; RMSEA = 0.060; SRMR = 0.034; AIC = 12578.077; CFI = 0.96; TLI = 0.91) thus the non-significant direct paths to criminal behaviour were dropped. As can be noted in *Table 2*, the improved model 2 presented in *Figure 1* indicates good fit ($\chi2$ = 26.67, df = 16, p = 0.05; RMSEA = 0.047; SRMR = 0.033; AIC = 12573.248; CFI = 0.97; TLI = 0.95) and explained 36% of the variance in criminal behaviour.

Table 3 presents standardised and unstandardised regression weights for the specified structural equation model of criminal behaviour (model 2). As can be observed, parental attachment has a significant, positive direct effect on parental supervision (β = 0.52, p < 0.001) and on relationships with peers (β = 0.39, p < 0.001). In spite of this significant finding, no direct relationship between parental attachment and criminal associations or criminal behaviour (model 1) was reported. The only indirect effect of attachment on criminal associations was indicated via parental supervision (β = −0.17, p < 0.01). Further investigation suggested a direct, moderate, negative effect of parental supervision on criminal associations (β = −0.32, p < 0.001) and strong, positive effect of criminal associations with criminal friends on criminal behaviour (β = 0.60, p < 0.001). The only

TABLE 3

Standardised and Unstandardised Regression Weights (with Standard Errors) for the Specified Structural Equation Model of Criminal Behaviour

Variables	β	B	SE
Measurement Level			
CRIMINAL BEHAVIOUR (CB) by			
Number of arrests (NOA)	0.74***	1.00	–
Number of incarcerations (NOI)	0.93***	0.75	0.11
CRIMINAL ASSOCIATIONS (CA) by			
Number of criminal friends (NF)	0.68***	1.00	–
Time spent with criminal friends (TF)	0.36***	0.35	0.10
ATTACHMENT (ATT) by			
Positive attachment (PA)	0.71***	1.00	–
Negative attachment (NA)	0.61***	0.47	0.07
Structural Level			
Direct Influence			
ATT ==> Supervision (PS)	0.52***	0.61	0.11
ATT ==> Peer relations (PR)	0.39***	0.63	0.15
ATT ==> CA	–0.17	–0.18	0.14
PR ==> CA	–0.07	–0.04	0.07
PS ==> CA	–0.32***	–0.29	0.10
CA ==> CB	0.60***	0.58	0.17
Indirect Influence			
ATT ==> CA via PS	–0.17**	–0.17	0.07
ATT ==> CA via PR	–0.03	–0.03	0.04
ATT ==> CB via CA	–0.10	–0.11	0.09
PS ==> CB via CA	–0.19***	–0.17	0.06
PR ==> CB via CA	–0.04	–0.03	0.04

(*Note*: statistical significance: ** p < 0.01; *** p < 0.001.)

indirect predictor of criminal behaviour was parental supervision via associations with criminal friends ($\beta = -0.19$, p < 0.001).

Discussion

The main objective of the current study was to test if aspects of parental attachment have a significant effect on criminal peer associations and further criminal conduct; or if they are mediated by parental supervision and peer relations. When looking at the results of family variables in predicting associations with criminal friends and engagement in criminal behaviour, the findings suggest a significant role of parental supervision. In line with control theory (Hirschi 1969), prisoners who reported a low level of parental supervision were more likely to develop ongoing relationships with criminal friends. This finding is strongly supported by previous research (Ingram *et al.* 2007; Loeber and Stouthamer-Loeber 1986; Patterson 1982; Rankin and Wells 1990; Sampson and Laub 1993), indicating that poorer parental supervision is associated with later engagement in criminal activities. The observation of an indirect effect of parental supervision on criminal behaviour through criminal peer associations indicates that the role of parental supervision had a significant effect in controlling the type of friends with whom individuals were associated. This indirect effect was also observed in previous research with at-risk adolescents (Ingram *et al.* 2007).

The findings from the current study which demonstrate lack of a direct effect of parental attachment on associations with criminal friends is inconsistent with previous investigations (Agnew 2001; Demuth and Brown 2004; Mack *et al.* 2007) apart from a study by Ingram and colleagues (2007) which suggested that strong attachment can contribute to better supervision with a proximal effect on reducing criminal behaviour (see also Jang and Smith 1997). The current results indicate that weak parental attachment influences indirectly the type of friends with whom individuals associate, due to insufficient or, in some cases, absence of, parental control. This indirect effect again illustrates that ineffective parental supervision is a key factor for the development of criminal association and further criminal conduct.

Although Dodge (2003) and Parker and Asher (1987) suggested that one of the strongest predictors of later participation in criminal behaviour is early rejection by peers, the present study did not find any significant effect of peer relations on criminal behaviour or associations with criminal friends. Based upon the empirically-tested model, parental control, rather than early peer rejection, is the main contributing characteristic of future participation in criminal conduct or association with criminal friends.

The strongest relationship in model 2 was represented by a regression path between associations with criminal friends and criminal behaviour. This finding is consistent with previous psycho-sociological research reporting a strong link between these two variables (Agnew 1991; Bender and Losel 1997; Conway and McCord 2002; Elliot, Huizinga and Menard

1989; Elliot, Huizinga and Ageton 1985; Gendreau, Little and Goggin 1996; Johnson 1979; Mills, Kroner and Forth 2002; Thornberry 1998; Keenan *et al*. 1995; Warr 1993). One possible explanation was presented by Akers (1985) in his Differential Reinforcement Theory. He suggested that individuals are first exposed to criminal behaviour by differential associations with criminal peers, and then, through differential reinforcement, they acquire necessary knowledge to avoid punishment. This theory fits very well into criminology because it helps to explain the process involved in the development of criminal associations and motivations necessary to commit criminal acts.

Despite the wealth of data within the empirical literature attesting to the relationship between a higher number of criminal friends and later engagement in criminal behaviour (Agnew 1991; Thornberry *et al*. 1994; Warr 1993, 2002; Warr and Stafford 1991), the nature of this relationship has been at the centre of much debate among scholars. There are three major perspectives which attempt to explain the connection between criminal behaviour and criminal friends (Matsueda and Anderson 1998). The first is reflected in low self-control (Gottfredson and Hirschi 1990) while the second view is based on interactional theory (Thornberry 1987; Thornberry *et al*. 1994) which postulates that criminal friends and criminal behaviour are mutually related. This research suggested a directional relationship between associations with criminal friends and criminal behaviour; however, it is necessary to consider Thornberry's hypothesis of a bidirectional relationship between associations between criminal friends and criminal behaviour, especially when such research is conducted among a sample of recidivists who are incarcerated. Literature also suggests a third perspective, consistent with current findings, that association with criminal friends has a direct impact on criminality, even after controlling for low self-control and previous criminal behaviour (Cullen and Agnew 2006; Matsueda and Anderson 1998; Pratt and Cullen 2000; Warr 2002; Wright *et al*. 1999).

Limitations

The present findings are generally consistent with prior investigations suggesting that family variables and criminal peer associations play a significant role in determining an individual's involvement in criminal behaviour; however, in relation to the limitations associated with the measurement and generalisability of the findings, two points need to be mentioned. First, the sample size did not allow the incorporation of other theoretically-important factors that might impact on the familial, peer, or criminal measures included in this project (for example, self-control and family diversity). In order to test this hypothesis, it would have been interesting to know how family diversity would contribute to the proposed model. Unfortunately, we neglected to include this question in our questionnaire.

Future research should consider a more extensive and diverse prison sample such as female offenders. This project has focused entirely on prisoners from a high-security prison for recidivists, whereas further

investigations should also consider different categories of prisons or places of detention. More importantly, in order to increase the generalisability of current findings, future research could also consider application of the proposed model to culturally-diverse prison populations. The current model of criminal behaviour with retrospective data, applied for the first time in criminological literature, used a sample of Polish prisoners, thus we cannot be certain whether the direct and indirect effects reported in the model were due solely to cross-cultural differences.

A second limitation is related to the self-reported measures and rating scales within a specific sample of prisoners who tend to exhibit a short attention span and poor command of language. Although the measures used in this study allowed for the collection of sufficient data within a short space of time, what is in doubt is the degree to which prisoners were capable of fully comprehending the questions included in the survey. Additionally, because the instruments are based on prisoners' self-reports, some of the observed effects (such as negative and positive attachment, or relationship with peers in school) might be the consequence of response bias. However, this part of the study design could not be controlled given the nature of the sample.

Conclusion

A strength of this study was the use of a sample of adult recidivistic prisoners in order to identify familial and peer-relation characteristics predicting criminal behaviour. Previous research examining this psycho-social issue has focused on at-risk children and adolescents. Therefore, this study provides an additional empirical contribution to existing literature on prediction of criminal friends' associations and criminal behaviour using retrospective data analysed within a single structural equation model.

Overall, findings suggest that weak family relationships and parental supervision can increase the probability of associations with criminal friends and subsequent criminal behaviour. As it is observed, parental attachment has a significant, positive direct influence on parental supervision and on relationships with peers, and an indirect impact on associations with criminal friends via parental supervision. Moreover, a direct negative relationship was identified between parental supervision and criminal associations, along with a strong, positive influence of associations with criminal friends on criminal behaviour. The only indirect predictor of criminal behaviour was parental supervision via associations with criminal friends. These results contribute to previous literature which suggests the need for a comprehensive crime-prevention plan that focuses on risk and protective factors from within multiple social domains (Ingram *et al.* 2007). Participation in criminal activity is significantly influenced by parental attachment, parental supervision, and association with criminal peers, and as such, programmes aimed at young offenders should embrace aspects intended to develop strong and positive associations with parents and pro-social friends, and decrease contact with criminal others. Finally,

developing good parental supervision at an early stage of children's psycho-social development may protect them from criminal influences, such as criminal friends, while exposing them to pro-social individuals (such as role models) as suggested by social learning theory.

It is generally recommended that public health education campaigns, directed particularly at parents, are necessary in order to inform people about the potential detrimental impact that the lack of an emotional relationship with their child and poor parental control can have on children and their behaviour. It is well known that parental influence can be a major factor in reducing the impact that anti-social friends will have on children. In addition to overall policy and research issues, many important legal issues concerning child delinquents must be resolved, including parental responsibility (Wiig 2001). The value of both making parents more legally responsible for their children's delinquency and of follow-up sanctions for parents, needs to be investigated.

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