

Sibling Influences on Adolescent Delinquent Behaviour: An Australian Longitudinal Study

Abigail A. Fagan, Jake M. Najman

School of Social Sciences, University of Queensland, Brisbane, QLD 4072, Australia

Abstract

This article examines sibling influences on adolescent delinquency at age 14, using data from an Australian longitudinal study of 374 same- and mixed-sex sibling pairs. Based on maternal and self-reports, a moderately strong association between siblings' delinquency is found. The relationship remains significant controlling for childhood aggression and family environment factors measured during childhood (age 5) and adolescence (age 14), using both standardized instruments and new scales. This effect varies according to the sex composition of the sibling pair and is stronger for males and those whose parents have been arrested. The need for increased attention to sibling influences by researchers and prevention practitioners is discussed.

1. Introduction

While a variety of family characteristics are recognized as risk factors for adolescent delinquency, the role of siblings has received much less attention. Nonetheless, recent research (Brook, Whiteman, Gordon, & Brook, 1988; Rowe & Gulley, 1992; Lauritsen, 1993; Brownfield & Sorenson, 1994; Conger & Rueter, 1996; Rowe, Linver, & Rodgers, 1996; Farrington, Jolliffe, Loeber, Stouthamer-Loeber, & Kalb, 2001) demonstrates strong sibling similarity in offending during adolescence, even as other family influences begin to wane in importance and be replaced by community, school, and peer risk factors. Siblings may be particularly likely to influence each other's behaviour, including acting as deviant peer role models, given the long-term and emotionally close relationships most share (Robins, 1966; Dunn, 1983; Sampson & Laub, 1993; Slomkowski, Rende, Conger, Simons, & Conger, 2001; Waddell, Pepler, & Moore, 2001). Thus, a sibling-specific risk factor may operate across the family and peer domains during adolescence, making sibling influences on delinquency a vital area for research and prevention efforts. This paper uses data from an Australian longitudinal study to examine these issues.

2. Review of the literature

Interest in the ways in which siblings may influence delinquency stems from research demonstrating that offenders tend to live in large families (Brownfield & Sorenson, 1994; Jones, Offord, & Abrams, 1980) and that a small number of families often account for a large proportion of officially convicted or self-reported offenders (Loeber & Stouthamer-Loeber, 1986; Lauritsen, 1993; Farrington, Barnes, & Lambert, 1996; Farrington et al., 2001). Farrington and his colleagues (1996) found that 10 per cent of

London families were responsible for 64 per cent of the adult convictions of male respondents in the Cambridge Study in Delinquent Development, while the same proportion of families accounted for 76 per cent of all self-reported offenses, 94 per cent of all felony theft offenses, and 100 per cent of all robberies in the National Youth Survey (Lauritsen, 1993). Further evidence of a concentration of delinquent siblings in some families stems from research demonstrating that adolescent offenders are more likely than non-offenders to have delinquent siblings (Jones et al., 1980; Kruttschnitt, Ward, & Sheble, 1987; Farrington et al., 1996, 2001).

These findings have led researchers to focus on the sibling relationship more closely, to determine the extent to which siblings are likely to engage in similar offending behaviours and to examine the ways in which brothers and sisters may directly influence one another's involvement in crime. In a recent review of literature assessing sibling similarity in delinquency, Rowe and his colleagues (1996) reported an average sibling correlation of 0.35. Other non-intellectual (i.e. personality) traits have an average correlation of 0.12 (Rowe & Plomin, 1981; Rowe & Osgood, 1984), suggesting that siblings may be particularly likely to emulate and/or influence one another's involvement in delinquent behaviour (Rowe et al., 1996). Moreover, some investigations demonstrate sibling associations as high as 0.50, with sibling similarity particularly likely for same-sex sibling pairs and those close in age. Such siblings may be most likely to view each other as salient role models, given their similar demographic characteristics, increased amount of time spent together, shared history of significant events, and so on (Wilkinson, Stitt, & Erickson, 1982; Brook et al., 1988; Rowe & Britt, 1991; Rowe & Gulley, 1992; Bank, Patterson, & Reid, 1996; Farrington et al., 1996; Rowe et al., 1996; Rowe & Farrington, 1997; Boyle, Sanford, Szatmari, Merikangas, & Offord, 2001; Slomkowski et al., 2001; McGue, Sharma, & Benson, 1996).

Sibling resemblance has been found for a range of behaviours, including aggression and externalizing behaviour (Kim, Hetherington, & Reiss, 1999; Garcia, Shaw, Winslow, & Yaggi, 2000), delinquency (Lauritsen, 1993; Brownfield & Sorenson, 1994; Slomkowski et al., 2001), and drug and alcohol use (Brook et al., 1988; Rowe & Gulley, 1992; Conger & Reuter, 1996; Boyle et al., 2001). Moreover, some investigations demonstrate sibling effects over time and into adulthood (Brook et al., 1988; Farrington et al., 1996, 2001; Bank & Burraston, 2001; Slomkowski et al., 2001). For example, Reiss and Farrington (1991) found that having a delinquency sibling helped predict chronic offending for London males through age 32. Other research shows that sibling effects remain significant controlling for shared family experiences (Brook et al., 1988; Rowe & Gulley, 1992; Lauritsen, 1993; Brownfield & Sorenson, 1994; Farrington et al., 1996, 2001). In other words, even though both siblings may experience similar risk factors within their families, such as parental arrest, single-parent status, or low family income, these experiences cannot fully account for sibling similarity in behaviour.

2.1. Limitations of previous research

Despite this evidence, other investigations indicate less support for sibling influences on offending, and certain methodological limitations suggest the need for additional research in this area. A few studies find that siblings do not directly influence each other's involvement in crime (Robins, 1966; Sampson & Laub, 1993) and others report weak or insignificant effects for siblings of the opposite sex (Wilkinson et al., 1982; Rowe & Britt, 1991; Rowe & Gulley, 1992; Rowe, Rodgers, & Meseck-Bushey, 1992; Slomkowski et al., 2001). In addition, Brownfield and Sorenson (1994) found that the number of siblings predicted delinquency for males, not females. Likewise, the number of male siblings has been linked to increased delinquency, while the number of female siblings has not (Jones et al., 1980; Lauritsen, 1993; Farrington et al., 1996). While these findings suggest that gender and sibling sex composition affect the extent to

which siblings influence each other's offending behaviour, further analysis is warranted, based on the small sample sizes and limited samples (i.e. including only same-sex siblings) of many investigations.

Because sibling research is a relatively new area of interest within criminology, many studies have identified correlations in sibling behaviour, but have not thoroughly investigated whether or not similarity may be explained by other factors. Most investigations include only a few family characteristics in their analyses and utilize child, rather than parental, reports of these characteristics (Brook et al., 1988; Rowe & Gulley, 1992; Brownfield & Sorenson, 1994; Farrington et al., 1996). A notable exception is Lauritsen (1993), who included parental reports of numerous family demographic and functioning variables and recommends that future studies improve the validity of their findings by replicating such procedures. Longitudinal investigations that control for respondents' prior involvement in problem behaviour are similarly rare (though see Garcia et al., 2000).

Relatedly, there have been few attempts to assess whether or not family characteristics moderate sibling influences on delinquency. Garcia and colleagues (2000) reported that children who experienced both sibling conflict and rejecting maternal behaviour were most likely to display aggression during early childhood. Few studies have assessed such interaction effects on adolescent outcomes, however, even though doing so will help specify the conditions under which siblings are most likely to affect each other's behaviour.

This study utilizes data from the Mater University Study of Pregnancy (MUSP), an Australian longitudinal study of women's and children's health and development, to address these issues. The investigation examines whether or not siblings' delinquent behaviour during early adolescence is related, and whether or not the strength of the relationship varies according to gender, sibling sex composition, shared family experiences and prior problem behaviour.

3. Method

3.1. The sample

Pregnant women attending their first prenatal hospital visit were recruited into the MUSP from 1981 to 1983. Of the 8556 women (99 per cent) who agreed to participate and completed prenatal interviews, 7661 gave birth to a live, singleton child and were interviewed just after the birth (when medical records were also examined). Additional assessments took place when children were 5 and 14 years old, with the 14-year follow-up occurring from 1995 to 1997 and including both maternal and child interviews (see Keeping et al., 1989 for further detail regarding the project design).

Six hundred and eighty-five women gave birth to a second child (i.e. the younger sibling) during the 3 years in which sample selection occurred, resulting in a sibling sample of 685 sibling pairs, or 1370 children aged 1 to 3 years apart. Demographic characteristics of the sibling sample are very similar to those of the larger sample. At entry to the study, mothers were 13–40 years old (mean=24 years). The majority (65 per cent) had completed high school, 20 per cent had not, and 14 per cent had tertiary education. Almost all (94 per cent) women were married at the time of birth, and 90 per cent were Caucasian. Approximately one-third of the sample was classified as low income.

At the 14 year follow-up, when adolescent delinquency was assessed, 374 sibling pairs (55 per cent) remained in the study, including 92 sister pairs, 96 brother pairs, and 186 mixed-sex sibling pairs. The attrition rate for the sibling sample is greater than that of the larger sample (69 per cent), given that if a mother or sibling withdrew from the

study, the other sibling was also likely to withdraw. Attrition analyses conducted for the full sample demonstrated that those lost at the 5 year follow-up were significantly more likely than those remaining to be teenagers at the time of their children's birth, have lower levels of education, and live in poverty when children were 0–5 years. This differential attrition is also likely to be more pronounced in the sibling sub-sample, and these variables are included in subsequent analyses.

3.2. Measures

3.2.1. Adolescent delinquency

Adolescent delinquency was measured using the delinquency sub-scale of the Child Behaviour Checklist (CBCL) (Achenbach & Edelbrock, 1983), completed by mothers and both children at the 14 year follow-up. In order to ensure that data were collected at approximately the same developmental period for all respondents, assessments occurred in the same order in which children were born; thus, older siblings' interviews preceded younger siblings' by 1–3 years. Given this chronology, older siblings' behaviours are used to predict younger siblings' outcomes. Separate maternal interviews were conducted in the same manner, so that mothers reported on older siblings' behaviour 1 to 3 years before reporting on younger siblings' delinquency.

Table 1

Descriptive information and association between maternal and child reports of adolescent delinquent behaviour, for older and younger siblings

	Mean	S.D.	Range	<i>r</i>
Older sibling				
Maternal report	2.68	2.73	0–16	0.52*
Child report	3.62	2.59	0–16	
Younger sibling				
Maternal report	2.56	2.90	0–21	0.59*
Child report	3.75	2.73	0–17	

* $p < 0.01$, based on Pearson correlation coefficients (two-tailed test).

The delinquency sub-scale completed by mothers assessed the extent to which children displayed 13 delinquent behaviours ($\alpha = 0.76$), including running away; setting fires; stealing; swearing; truancy; vandalism; using drugs or alcohol; having delinquent peers; and so on, with response choices of “rarely/never,” “sometimes,” or “often” (coded 0 to 2). According to maternal reports, mean delinquency scores were similar for older (2.68) and younger (2.56) siblings (see Table 1). Because the frequency of delinquent activities was highly skewed, with the majority of adolescents having very low scores, a log transformation was performed and the logged frequency used in all analyses.

The delinquency sub-scale completed by children assessed the frequency with which they engaged in eleven behaviours ($\alpha = 0.71$), with identical items to those included in the maternal report, but excluding two behaviours (vandalism and preoccupation with sex). As shown in Table 1, mean scores were 3.63 for older siblings and 3.75 for younger siblings. (Scores on this measure were not logged.)

It should be noted that most sibling investigations have not relied on maternal reports, assuming that if sibling similarity is found, it will be due to mothers providing information on both children, rather than to a genuine sibling effect. While this may be true, comparing outcomes based on maternal and child reports will help determine the extent of maternal bias. Moreover, similar outcomes obtained using both sources will strengthen evidence regarding sibling influences.

In fact, the difference in mean scores between maternal and child reports of

delinquency (shown in Table 1) indicates that mothers tend to under-estimate the extent to which their children engage in delinquent behaviour. While self reports may provide a more accurate assessment of problem behaviour, maternal reports may still be a valid means of assessing sibling influences, given that mothers under-estimate the frequency of *both* older and younger siblings' delinquent behaviour. In addition, even though the mean scores differ, maternal and child reports are highly correlated (see Table 1), providing further evidence that both sources may be relied on to assess sibling concordance.

3.2.2. Shared family characteristics

Family environment characteristics generally associated with delinquency were included in the analyses to examine whether or not they could account for sibling similarities in delinquency. Information was provided by mothers at the 5 and 14 year follow-up interviews focused on younger children, with the exception of maternal age and level of education (whether or not mothers completed high school), which were assessed at the prenatal interview. Descriptive information regarding the variables and their bivariate association with younger siblings' delinquency is provided in Table 2. For ease of interpretation, most variables were dichotomized, with higher scores representing a risk for delinquency.

Table 2
Independent variables and their association with younger siblings' delinquent behaviour

Variable	Mean	S.D.	Range	Time of assessment	<i>r</i> (Maternal report)	<i>r</i> (Child report)
Maternal						
Age	25.16	4.47	15–40	Prenatal	-0.12*	-0.08
Low education (<high school)	0.15	0.36	0–1	Prenatal	0.13*	0.06
Stressful events in last 5 years	2.26	2.16	0–16	5 year	0.15**	0.12*
Anxiety	0.16	0.37	0–1	5 year	0.23**	0.17**
1+marital changes in last 5 years	0.14	0.34	0–1	5 year	0.12*	0.13*
Single parent	0.18	0.38	0–1	14 year	0.21**	0.19**
Intimate partner violence	0.07	0.26	0–1	14 year	0.19**	0.14*
Family						
Number of male children	1.57	1.06	0–4	5 year	0.13*	0.13*
Parental arrest	0.14	0.35	0–1	14 year	0.11*	0.13*
Low income	0.21	0.41	0–1	14 year	0.22**	0.18**
Good parent/child communication	0.79	0.41	0–1	14 year	-0.35**	-0.15**
Poor parent/child communication	0.21	0.40	0–1	14 year	0.33**	0.16**
Child						
Sex (male=1)	0.50	0.50	0–1	Birth	0.26**	0.16**
Aggression	6.00	3.59	0–20	5 year	0.35**	0.20**

* $p < 0.05$.

** $p < 0.01$ (two-tailed test) Pearson correlation coefficients.

In addition to age and education, maternal characteristics included the number of changes in marital status when children were age 0–5 and marital status at the 14 year follow-up. Stressful life events is represented by the total number of events (e.g. death/illness of a friend/family member; unemployment; family moves, and so on) experienced when children were aged 0–5. Maternal anxiety denotes mothers reporting 4 or more of 7 anxiety symptoms ($\alpha=0.83$) from the Delusions Symptoms-States Inventory (Bedford & Foulds, 1978). Intimate partner violence assessed the frequency of partners' yelling, throwing objects, pushing, hitting, etc. according to 7 items ($\alpha=0.98$) from the Conflict Tactics Scale (Straus, 1979). Those who sometimes or always experienced the majority of behaviours were considered victims.

Family characteristics included the number of male children in the family, whether or not either parent had been arrested, and low family income (annual income less than \$20,800 or \$400/week). The Parent-Adolescent Communication Scale (Barnes & Olson, 1982) was used to assess parent/child communication, with ten items each indicating communication styles that were good (e.g. sharing feelings, talking and listening to children, showing affection, etc., $\alpha=0.85$) and poor (e.g. avoidance of discussion, insults by child, nagging by child, etc., $\alpha=0.77$). Other family characteristics considered for analysis but omitted due to their lack of bivariate association with adolescent delinquency included family size and number of female children, and a range of early childhood parenting practices assessed at the 5 year follow-up, such as endorsement of spanking for misbehaviour and maternal supervision and control of children.

3.3.3. Child characteristics

Younger sibling's sex and early aggression were also included in the analyses. Sex was taken from medical records at birth, while aggression was measured using maternal reports from a shortened version of the CBCL, completed at the 5 year follow-up. The aggression sub-scale consisted of ten items ($\alpha=0.83$) regarding the frequency with which the child screams/argues; destroys things; is sullen or stubborn; fights; has a temper; and so on. Sex and aggression were strongly and positively related to adolescent delinquency, as shown in Table 2.

3.4. Data analysis

Sibling similarity in delinquency was first assessed using Pearson correlation coefficients for older and younger siblings' delinquency. Then, stepwise ordinary least-squares (OLS) regression analysis was used to determine whether or not older siblings' delinquency was related to younger siblings' similar behaviour, controlling for shared family and individual characteristics. Older siblings' delinquency was entered in the first step, shared family characteristics significantly ($p<0.05$) correlated with delinquency were entered in the second step, and the sex and aggression of the younger sibling were added in the third step. All analyses were performed for the total sibling sample and for siblings differing in sex composition (i.e. for sisters, brothers, and mixed-sex pairs), with separate models for maternal and child reports. Finally, interaction terms were created and entered into OLS regression analyses to determine whether or not the sibling resemblance was moderated by sex, prior aggression, or family characteristics.

4. Results

4.1. Sibling resemblance in delinquent behaviour

Table 3 presents Pearson correlation coefficients for older and younger siblings' delinquent behaviour, as reported by mothers and adolescents for the total sample and for same- and mixed-sex siblings. All correlations were significant and indicate a strong sibling resemblance in adolescent delinquency. For the full sample, the size of the association (0.27) was the same according to maternal and child reports. A comparison of the associations presented in Tables 2 and 3 indicates that older siblings' delinquency was more closely related to younger siblings' delinquency than were each of the other family characteristics, with the exception of parent/child communication.

Table 3
Pearson correlation coefficients for older and younger siblings' delinquent behaviour

	Full sample	Sisters	Brothers	Mixed sex
Maternal reports	0.27**	0.33**	0.26**	0.26**
Child reports	0.27**	0.21*	0.41**	0.21**

* $p < 0.05$.

** $p < 0.01$ (two-tailed test)

The results further indicate a significant and relatively strong relationship between siblings regardless of sex composition of the pair. However, effects were somewhat stronger for sisters according to maternal reports, while child reports illustrated a much stronger resemblance for brothers (0.41) than sisters (0.21) or mixed-sex (0.21) pairs. Differences according to sex composition and reporting source were further explored in multivariate analyses.

4.2. Do shared family experiences account for sibling similarity in delinquency?

OLS regression analysis was performed to determine whether or not sibling similarity in delinquent activities could be explained by shared characteristics of the family, rather than by the sibling relationship itself. Although stepwise regression was performed, results did not substantially change between steps, and the standardized and unstandardized coefficients for the final models are presented in Table 4 for the full sample.

Outcomes based on maternal reports demonstrated strong support for sibling resemblance in delinquency, with older siblings' adolescent delinquency significantly related to younger siblings' similar behaviour. A comparison of the standardized coefficients indicated a relatively strong effect, as the sibling coefficient was greater than that of many family factors typically associated with adolescent delinquency, including marital status, parental criminality, and family income. When entered into the model alone, older siblings' delinquency accounted for approximately seven per cent of the variance of younger siblings' delinquency. Adding the other variables to the model reduced the sibling coefficient by more than half (from 0.28 to 0.11), but it remained significant, indicating that shared experiences cannot fully account for sibling resemblance in delinquency. It should also be noted that the number of male siblings did not predict younger siblings' delinquency; thus, family size may be less important than siblings' delinquency in leading to involvement in crime. That the sibling coefficient remained significant controlling for childhood aggression is also noteworthy, particularly as few studies have included prior problem behaviour in their analyses.

As shown in Table 4, child reports also indicated resemblance in sibling behaviour, although the sibling coefficient only approached significance ($p < 0.10$) in the full model. A comparison of the standardized coefficients again indicated the relative importance of the sibling effect, as the sibling coefficient was similar or greater to the majority of other predictors. Likewise, neither the shared family environment nor individual characteristics could fully account for the sibling relationship, although they did reduce the size of the sibling coefficient from 0.23 in the first step of analysis to 0.11 in the full model. While parental arrest had an independent effect on delinquency, it alone reduced the sibling coefficient by only a small amount. In summary, both maternal and child reports indicate that while a proportion of sibling similarity may be explained by the shared environment, siblings influence one another independently of these factors.

Table 4
The relationship between older and younger siblings' adolescent delinquent behaviour (OLS regression)^a

Variable	Maternal		Child	
	Beta	B	Beta	B
<i>Older sibling delinquency</i>	0.11**	0.11	0.11*	0.12
Maternal age	-0.06	-0.01	—	—
Maternal low education	0.07	0.14	—	—
Stressful life events	0.06	0.02	0.10	0.14
Maternal anxiety	0.11**	0.21	0.12**	0.88
1+marital changes	0.05	0.12	0.13**	1.22
Single-parent status	0.08	0.29	0.14**	1.75
Intimate partner violence	0.14***	0.40	0.07	0.75
Number of male children	-0.00	-0.00	0.08	0.21
Parental arrest	0.00	0.01	0.11*	0.83
Low family income	0.03	0.06	-0.03	-0.24
Good communication	-0.22****	-0.38	-0.04	-0.29
Poor communication	0.14**	0.24	0.03	0.19
Child aggression	0.15***	0.03	0.02	0.01
Sex (male)	0.24****	0.34	0.12*	0.63
Adjusted R^2		0.37		0.15
F (degrees of freedom)		10.05****		4.69****
N		274		279

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

**** $p < 0.001$ standardized and unstandardized coefficients.

^aAdolescent delinquency was assessed when children were age 14, according to the delinquency sub-scale of the Child Behaviour Check List (Achenbach & Edelbrock, 1983), completed by mothers and children.

Additional OLS regression analyses were performed for sibling pairs differing in sex composition. According to maternal reports, the sibling coefficient approached significance ($p < 0.10$) in the final models for sister and mixed-sex sibling pairs, but no effect was found for brothers. In contrast, when child reports were used, older siblings' delinquency was strongly related to younger siblings' delinquency (a standardized coefficient of 0.40), but no relationship was found for sisters or mixed-sex pairs. While these findings suggest that effects vary according to the sex composition of the sibling pair, they must be taken with some caution, due to small sample sizes, particularly for same-sex models (e.g. there were 66 sister pairs in the model based on maternal reports).

4.3. Moderating effects on sibling influences

A final set of analyses was performed to determine whether or not individual or shared family characteristics moderated the effect of sibling influences on adolescent delinquency. Interaction terms between older siblings' delinquency (as reported by mothers and children) and the independent variables significantly related to outcomes in the previous models were created and entered into an OLS regression analysis. If significant effects were found, all other variables were added to the model.

No interaction effects were found using maternal reports, but several were found for analyses based on child reports. Regarding individual characteristics, a strong, positive sex by older sibling delinquency interaction was found, indicating that younger male siblings were more likely than females to be influenced by older siblings' delinquent behaviour. Prior aggression did not moderate the sibling effect. Regarding shared family characteristics, there was a positive interaction effect for parental arrest,

even controlling for other predictors, demonstrating a stronger sibling influence for those whose parents had been arrested. For example, the Pearson correlation coefficient between siblings whose parents were arrested was 0.57, compared to 0.20 for siblings whose parents had never been arrested. The interaction term between single-parent status and older sibling delinquency approached significance in the reduced model, but was not significant controlling for other predictors, providing only partial evidence that sibling effects are stronger for children with single mothers. Neither maternal anxiety nor parental intimate partner violence moderated the sibling influence on delinquency.

5. Discussion

This investigation demonstrates strong support for sibling resemblance in adolescent delinquency and explores possibilities regarding the ways in which siblings may influence each other's behaviour. To summarize the findings, there was a moderately strong correlation between older and younger siblings' involvement in delinquency, which remained significant controlling for a range of shared family characteristics, as well as early childhood aggression, and were evidenced using both child and maternal reports. There was some variation in the strength of the relationship according to the sex composition of the sibling pair, and stronger sibling effects were found for males and those whose parents had been arrested.

This study is one of the first to examine sibling similarity in delinquency using an Australian sample of adolescents, yet the findings closely correspond to those produced in other countries. The correlation in sibling delinquency (0.27) is very similar to that reported by Lauritsen (1993) using the National Youth Survey in the United States (0.30), and only somewhat lower than the average correlation of 0.35 identified in review of the literature (Rowe et al., 1996). Strong evidence of a sibling effect was found even controlling for numerous family characteristics typically associated with delinquency, including maternal mental health, marital status, family violence, parental criminality, family income, and parent/child communication. Thus, even though both siblings may have been exposed to the same risk factors in their family of origin, these experiences could not fully account for resemblance in behaviour. Even early childhood aggression, strongly related to later delinquency (Hawkins et al., 2000; Lipsey & Derzon, 1998; Loeber & Dishion, 1983; Wiebush, Baird, Kinsberg, & Onek, 1995), did not substantially weaken the strength of the sibling relationship. This finding is significant, given that very few studies include childhood behaviour in their analyses, and, as a result, may overstate the association between siblings' behaviour.

Together, these findings reinforce others' contention that sibling resemblance in delinquency cannot be fully explained by shared experiences, but must be attributed to the sibling relationship itself (Brownfield & Sorenson, 1994; Lauritsen, 1993; Rowe et al., 1996; Rowe & Rodgers, 1989). Specifying the conditions under which siblings are most likely to influence one another, however, has not been much examined.¹ Prior research suggests that sibling resemblance may be affected by sex composition of the sibling pair, with same-sex siblings, particularly males, more likely to display similar behaviour than siblings of the opposite sex (Rowe & Gulley, 1992; Slomkowski et al., 2001). In contrast, the current investigation demonstrated significant sibling effects for mixed-sex siblings, according to bivariate analysis and the multivariate model relying on maternal reports. It is important to note, however, that delinquency was measured

¹ A notable exception is research exploring the ways in which the affective quality of the sibling relationship influences outcomes, with investigations finding both that warm sibling relationships, and those characterized by hostility, increases the likelihood of problem behaviour (Bank & Burraston, 2001; Bank et al., 1996; Garcia et al., 2000; Kim et al., 1999; Patterson, 1986; Rowe & Gulley, 1992; Slomkowski et al., 2001).

early in adolescence, and with the CBCL, which may include less serious offenses in its delinquency sub-scale compared to other measures. Because gender differences in delinquency are generally less apparent for younger children and for less serious offenses, significant sibling effects for mixed-sex pairs may also be more easily achieved in this study. That mixed-sex effects are not found when relying on child reports makes this interpretation less certain, however. These results highlight the need for further analysis of the ways in which sibling sex composition affects involvement in delinquency, particularly by investigations involving larger sample sizes.

This study was also one of the first to examine moderating effects on sibling influences. Based on child reports, the results demonstrated stronger sibling effects for males, compared to females, and for siblings in single-parent families and whose parents had been arrested. While these findings require replication, they are consistent with criminological literature. Others have found stronger sibling effects for brothers (Jones et al., 1980; Farrington et al., 1996; Boyle et al., 2001), most likely because males are generally more likely to be offenders, and, by extension, older brothers are more likely than older sisters to act as deviant role models for younger brothers. Similarly, younger siblings who have delinquent parents *and* siblings may be especially likely to become delinquent, given their increased likelihood of viewing delinquent activities and learning attitudes favourable towards offending. Finally, in single-parent homes, parental supervision may be lacking, giving siblings more opportunity to engage in delinquency. While requiring further investigation, the results are an important first step in exploring the conditions under which sibling influences are likely to emerge, and further research may uncover additional moderating effects.

This investigation was innovative in relying on multiple sources of information regarding adolescent delinquency. Although maternal reports are often considered biased, and mothers did under-estimate the number of delinquent acts committed by their children, outcomes were largely similar according to maternal and child reports. The sources demonstrated identical correlations in sibling behaviour, and older siblings' delinquency predicted younger siblings' behaviour in multivariate analyses, according to both sources. The largely comparable findings bolster support for sibling effects on delinquency and demonstrate some validity for maternal reports.

The results underscore the need for more awareness of the ways in which siblings may affect each other's involvement in problem behaviour, particularly by prevention researchers. While there are many family-based intervention programs targeting delinquency, most focus on changing target children's or parents' behaviour, or on improving parent-child relationships. In contrast, few examine sibling relationships or include siblings in their intervention sessions. However, the current findings suggest that sibling relationships may be a primary mechanism through which social learning takes place, and without attention to these processes, effective prevention of problem behaviour is hampered.

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