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ORIGINAL ARTICLE

"All in the family?" The Relationship Between Sibling Offending and Offending Risk

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Abstract

Purpose The purpose of this study is to investigate the associations between criminality of family members and individual offending. The main focus is on investigating the extent to which criminal offending by siblings is associated with individual offending, as well as the extent to which parental and grandparental offending accounts for this relationship.

Methods Using official conviction data on three generations of Dutch individuals who are at elevated risk of offending, multilevel logistic regression analyses were performed.

Results The analyses showed that sibling offending increased the risk of individual offending. Parental and grandparental offending only partially accounted for this association. However, parental offending and offending by grandfathers increased the risk of individual offending as well. Furthermore, the analyses showed that offending by brothers and sisters both increased the risk of offending for both men and women.

Conclusions Sibling criminality seems to be a risk factor in its own right. Therefore, focusing only on children of criminal parents is insufficient. Furthermore, it was found that almost every subsequent offending family member adds risk for children to offend.

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Introduction

International research has demonstrated that crime concentrates in families (e.g. [2, 9, 27]). The criminological literature on the intergenerational transmission of criminal offending has grown rapidly in the past 20 years and has shown that children of offenders are at increased risk of offending themselves [3, 5, 13, 21, 24, 25, 27]. However, family influences on criminal offending are not limited to the parents. For example, grandparents can be important influences, especially when they maintain close contacts with their grandchildren or assist in raising them. Siblings may be particularly important influences as they are usually close in age and therefore often exposed to similar environmental influences. Furthermore, children learn from each other and sometimes act as surrogate parents. As a result, siblings can considerably influence each other when it comes to criminal behaviour.

Few studies have investigated sibling similarity in offending, aside from a large number of twin studies that often focus on genetic risk factors and less on sibling influences in general (e.g. [29]). As our study focuses on sibling similarity in offending rather than on genetic versus environmental risk factors, only studies with the same focus are discussed (e.g. [2, 8, 9, 21, 26]). These studies generally showed a moderate to strong similarity in the number of offences committed by siblings. However, a number of issues were rarely addressed. First, it is questionable what remains of the influence of siblings after accounting for the influence of parents and grandparents. Sibling similarity in offending may be caused by influences on the parental or grandparental level as siblings belong to the same family, are often raised by the same parents and are usually exposed to the same grandparents. Second, very few studies examined the extent to which the age difference between siblings matters. Siblings close in age may spend more time together and mutually influence each other. It can therefore be expected that they are more similar when it comes to offending than siblings with larger age differences. This reasoning is in line with the results of two Swedish studies on large samples that found that siblings closer in age are more similar in drug abuse [14] and violent criminal behaviour [15]. The third issue relates to the role of gender. Although a number of studies have investigated sibling similarity in offending for same and mixed gender siblings (e.g. [2, 21]), few focused on the specific role of gender. As male offenders are traditionally known to be responsible for the large majority of offences (e.g. [16]), having an offending sister can be viewed as being more deviant than having an offending brother. Therefore, it is interesting to examine whether having an offending sister is a bigger risk factor for criminal offending than having an offending brother.

These considerations lead to the following research questions:

1. To what extent is criminal offending by siblings associated with individual offending?
2. To what extent does the criminality of parents account for that relationship?

3.   To what extent does the criminality of grandparents account for that relationship?
4.   To what extent do age differences between siblings and the gender of siblings moderate that relationship?

Literature Review and Theory

A number of studies have investigated sibling similarity in offending. For example, in an Australian study with 374 sibling pairs, Fagan and Najman [8] found a moderately strong correlation between siblings' reported delinquency, even when controlling for familial factors such as family income, parental arrest, and intimate partner violence. Using data from the American National Longitudinal Study of Adolescent Health, Beaver [2] found that the self-reported arrest of a sibling highly increased the odds of an individual also being arrested. These odds were slightly higher for same-gender siblings. Farrington et al. [9] investigated the relationship between family members who had been arrested and delinquency in a sample of 932 boys from the Pittsburgh Youth Study. It was found that having an arrested sibling, parent, aunt, uncle, and grandfather all increased the risk of delinquency of boys. These studies therefore suggest that sibling offending is a clear risk factor for criminal behaviour. However, as mentioned above, many studies found that parental offending is also a risk factor for offending (e.g. [9, 21, 26]). This may explain sibling similarity in offending, as parental offending is a risk factor for all offspring.

There have been a number of studies that simultaneously investigated both intergenerational and intragenerational transmission of offending within families. For example, Rowe and Farrington [21] analysed a sample of 344 families with at least two children from of the Cambridge Study in Delinquent Development to examine the familial transmission of criminal convictions. This study found moderately strong correlations between parental and offspring convictions, as well as between convictions of siblings. Correlations between same-gender siblings were stronger than between mixed-gender siblings. A study on the Dutch Criminal Career and Life-course Study data investigated the extent to which variation in criminal convictions can be explained by the criminality of siblings [26]. This study also investigated whether parental criminality accounted for that relationship. The authors found a moderately strong correlation between the criminal conviction histories of siblings, stronger than the correlations between parents and their children. Furthermore, parental convictions only modestly accounted for the association between the criminal convictions of siblings. In conclusion, the abovementioned studies suggest that sibling offending is an important factor in predicting an individual's offending behaviour, even when parental offending is accounted for.

Two types of arguments have been proposed that may explain sibling similarity in offending. The first assumes a direct influence of siblings on each other in the form of social learning or co-offending. Social learning theory suggests that people learn through observing behaviours and attitudes from others and later model their behaviour to an extent to the observed behaviour [1]. In the case of siblings, a child may observe criminal behaviour by his or her sibling(s), learn from it, and eventually show criminal behaviour him- or herself. This does not necessarily need to be a one-sided influence. Siblings, especially those that are close in age, might take turns in setting the examples

for each other as there is less of a fixed teacher-student situation compared to that between parents and children. Next to this, there may be co-offending as siblings might commit crimes together, explaining similarity in offending behaviour.

The second argument is that the relationship between siblings' offending is in part spurious. Sibling similarity in offending may be (partially) explained by parental factors for various reasons. For example, parents may pass on genes that are associated with an increased risk in offending to their children, explaining sibling similarity in offending. Although a lot is still unknown about how genes are related to criminal offending, research has shown that genetic similarities can account for a considerable part of similarities in offending between family members (e.g. [2, 19]). As with parents and children, siblings (except monozygotic twins) on average share 50% of their segregating genes. Because genetic influences account for a considerable proportion of variance in offending, siblings may be more similar to each other in offending behaviour than non-related persons [2, 9]. Siblings are often also under the same environmental influences, such as poverty or living in a deprived neighbourhood, which can be risk factors for offending [9]. In addition, siblings may share social relations outside the family, such as friends. When two siblings share delinquent friends, each is exposed to potential risks that are associated with these relationships.

It is important to take into account parents and grandparents when studying sibling similarity in offending, as previous studies have repeatedly found intergenerational transmission in offending. An extensive body of research supports the notion that parental offending puts children at risk of offending [3, 5, 13, 21, 24, 25, 27]. A study on violent crime in families found that also violent crime of grandparents was associated with violent crime in grandchildren [12]. There are a number of possible explanations for this besides the earlier mentioned transmission of genes. For example, criminal parents are more likely to be engaged in poor parenting styles or poor parental supervision, which in turn increases the risk of offending in all of their children [9, 30]. However, a more direct influence is also possible. A study on the Dutch Transfive dataset which investigated the intergenerational transmission of violent offending found support for the hypothesis that exposure to parents who committed violent offence(s) increased the risk of offending [27]. A possible explanation for such an exposure effect could be social learning. Next to parental offending, exposure to grandparents who offended may also put children at risk of offending through processes of social learning. As offending by parents and grandparents is found to predict offspring offending, accounting for these associations is important in investigating sibling similarity in offending. In other words, (grand-)parental offending can be seen as indicative of family criminality, which needs to be controlled for when investigating sibling similarity in offending.

Indirect support for the idea of direct influences of siblings comes from before-mentioned studies that found a strong correlation between the criminal history of siblings, while parental criminality or other family characteristics only moderately accounted for that relationship [8, 17, 21, 26]. Other studies also provided more direct evidence. An American sibling study found that sibling resemblance in delinquency was greater when sibling pairs reported warmer mutual friendships or greater contact with mutual friends, while factors such as social class and parental rearing styles did not explain the effects of delinquent siblings [22]. Another American study found similarity in both sisters' and brothers' delinquent behaviour [23]. Delinquency by an older sibling appeared to be related to subsequent delinquency by a younger sibling for both

brothers and sisters. More importantly, hostile interactions between siblings explained a substantial part of sibling similarity in delinquency. For brothers, high levels of warmth-support within the relationship also attributed to explaining sibling delinquency, in accordance with Rowe and Gulley's findings. In addition, research has also found evidence that co-offending can partially explain sibling similarity in offending [20].

In contrast, Rowe and Gulley [22] found that the deviance of shared friends partially accounts for sibling similarity in delinquency, suggesting an indirect relationship between sibling offending and one's own offending [22]. Furthermore, Beaver [2] investigated the familial concentration and transmission of crime and claimed that genetic similarities in families likely account for a large part of sibling similarities in arrests in his study. Finally, some of the earlier mentioned studies that found evidence for direct sibling effects also found that parental factors in part account for sibling similarity in offending [8, 21, 26].

Hypotheses

Based on the discussed theories and studies, we will test four hypotheses. As literature on sibling similarities in offending in an overwhelming majority finds support for such similarities, the first hypothesis is:

H1: Criminal offending by sibling(s) is related to individual criminal offending.

Our literature review discussed evidence for a relationship between sibling offending and individual offending. There are studies and explanations for this relationship that point to either direct effects or a spurious relationship, such as parental offending explaining offending of all offspring. Studies provided evidence for the intergenerational transmission of offending, and parental offending explained a part of sibling similarities in offending in several studies. It is largely left unstudied the extent to which grandparental offending may account for sibling similarities in offending. Grandparental offending may be accounting for a part of sibling similarities in offending in the same way as parental offending has been found to do. Therefore, the second hypothesis is:

H2: Parental and grandparental offending partially accounts for sibling similarities in offending.

One of the aims of this study is to investigate the role of gender in the relationship between sibling offending and individual offending. We formulate two competing hypotheses about this role of gender. First, as supported by previous studies, siblings of the same gender may on average have more similar interests [18] and engage in more similar activities [2, 18, 21] and therefore possibly having a stronger influence on each other. This leads to the following hypothesis:

H3a: Having an offending sibling of the same sex is a greater risk factor for individual offending than having an offending sibling of the opposite sex.

Second, previous research on the role of gender in sibling similarity in offending has mainly focused on same-sex sibling pairs and comparing them with mixed-sex sibling pairs. The extent to which having a brother or sister who offended is a greater risk factor for individual offending usually remains

unanswered (for an exception, see [2]). Because female offending is more rare, it is likely indicative of greater family dysfunction and more personal and family-related risk factors for criminal behaviour and considered to be more deviant. Therefore, this can be expected to be a greater risk factor compared to male offending, which is more common. This leads to the following hypothesis:

H3b: Having an offending sister is a greater risk factor for individual offending than having an offending brother.

Finally, this study investigates the extent to which age differences between siblings matter in the association between sibling offending and individual offending. Siblings who are closer in age pass through childhood phases at a more similar time and may spend more time together than siblings who are more distant in age. Therefore, these siblings may be more influential on each other, engage more in co-offending, or be more similarly exposed to risk factors. In line with this line of reasoning, Kendler et al. [14, 15] showed that Swedish siblings are more similar with respect to drug abuse and violent criminal when they are closer in age. This leads to the fourth hypothesis:

H4: Individuals with an offending sibling close in age are at elevated risk of offending, while individuals with only an offending sibling not close in age are not.

Method

Sample

This study uses data from the Transfive study, which contains registered information about five generations of Dutch citizens. The starting point of the dataset is 198 adolescent males who were placed in a reform school in the Netherlands between 1911 and 1914. On average, they had been born in 1899. The boys were placed in the reform school because of concern about their character and behaviour (including delinquency) or because their parents were unable to take proper care of them according to guardian organisations. Therefore, they constituted a high-risk sample. Next to their parents, all descendants from this generation onwards were traced in Dutch genealogical and municipal records. Sample members who emigrated were considered lost to follow-up. Registered marital partners were added to the dataset. Figure 1 summarises the sample design. As can be seen in the figure, generation 1 (G1) is the boys' parents, generation 2 (G2) is the 198 boys, and generations 3 (G3), 4 (G4), and 5 (G5) are descendants of those boys. The total N was 6403, including all marital partners. For more on the original dataset, see Bijleveld and Wijkman [5].

Data were retrieved in 2007. Data of municipal records, containing information about birth dates, marriage dates, family structure, and other variables were included for all sample subjects. For each sample member, the computerised paper and microfilm archives of the Dutch Criminal Records Documentation Service ("judicial documentation") were searched. The paper and microfilm archives are complete except for the data from one region for a number of years that were destroyed accidentally, which means that some judicial data may be missing for an estimated 3% of individuals in G3
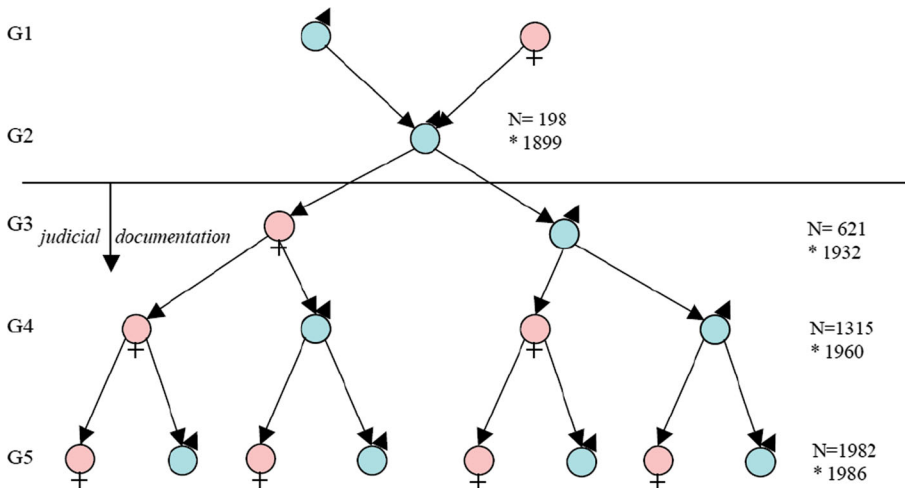
Fig. 1 Schematic representation of the structure of the dataset

and G4. The electronic records give complete coverage. Not counted were cases that resulted in an acquittal or so-called technical "dismissals" (i.e. a dismissal of the case by the public prosecutor, because there is insufficient evidence and the case is expected to result in acquittal). As only a portion of the actual crimes is reported to the police, our offending measures constitute the lower limit of the sample's true offending.

In this study, G5 descendants of the G2 boys were selected. They were only included if they had reached the age of 18 before the point of data collection (2007). Furthermore, stepchildren and children with half-siblings were excluded from all analyses because they differ from full siblings in the degree that they share environments and genes. Moreover, families with half-siblings at the parent level were also excluded in the analyses that included variables at the grandparent level. This was done to ensure that the grandchildren of each family were nested within the same grandparents in the multilevel analyses.[1] These criteria resulted in a sample of 924 individuals (47% of all G5). For the main analyses, the inclusion of all 924 individuals leads to dependency issues. Individual characteristics would be included as both dependent and independent variables as individuals would be sample members and siblings of other sample members at the same time. To tackle these problems, we performed this study's main analyses 100 times, each time randomly selecting one child per family (496 out of a total N of 924). The mean outcome of the 100 simulations was calculated and reported in the Results section. For the same reason, additional analyses were also simulated 100 times.

Variables

For each sample member, the total number of officially registered offences committed since age 12, the age of legal responsibility in the Netherlands, was calculated. The

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[1] In the analyses that focus on the moderating influence of gender and age differences, no variables on the grandparent level were included, and this selection criterion was therefore not used in these analyses. However, these analyses were also repeated with this selection criterion and this did not change the conclusions based on these analyses.
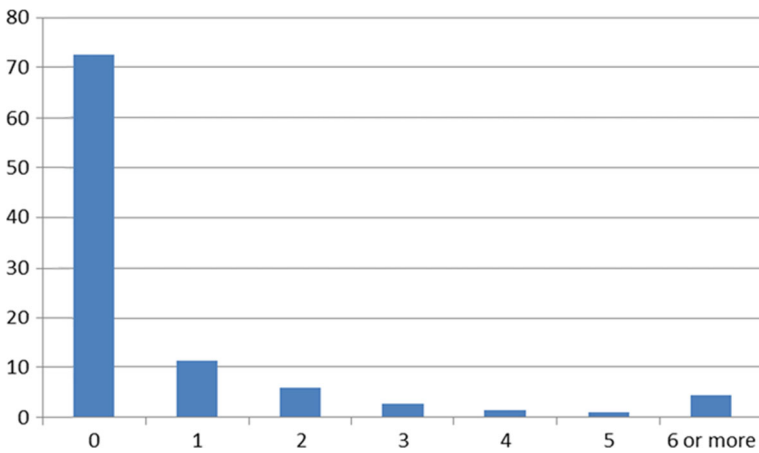
Fig. 2 The number of registered offences (x-axis) vs. the percentage of sample members (y-axis)

distribution of the number of offences was highly right skewed, with mostly zero offences (see Fig. 2). Therefore, the dependent variable was dichotomised with the two options being having offended or not. The same was done for the offending of siblings, parents, and grandparents. Grandparental offending data was only included for the G3 grandparents as we have no data on the parents of partners of G4 individuals. This is due to the structure of the dataset: G2 descendants and their marital partners were traced, not the parents of these marital partners.

The variable indicating siblings' offending was constructed as a categorical variable, with the first category as the reference category: (0) "No sibling offended", (1) "No siblings", (2) "Siblings too young to be included in analyses", and (3) "At least one sibling offended". Siblings were only included as offenders (3) or non-offenders (0) if they were above the age of 17 at the time of data collection. If at least one of the siblings was above age 17, the category was 0 or 3, regardless of any siblings below age 18. The reason for including individuals without siblings in the analysis is to be able to both investigate the extent to which having offending siblings is a risk factor compared to having no siblings, as well as investigating the extent to which having non-offending siblings is a protective factor, again compared to having no siblings. Parental and grandparental offending was measured as a dichotomous variable indicating whether at least one of the parents or grandparents had offended or not. In addition, the age of the sample member at the time of data collection was also included in the models as older sample members have more exposure time. Another control variable was the gender of the sample member as men are more likely to offend than women.

Analyses

Logistic regression analyses were performed in order to test whether offending by a sibling influenced own offending, while controlling for other factors such as age, gender, and parental and grandparental offending. Parental and grandparental offending is included in order to investigate whether they partially account for sibling similarity in offending. A two-level logistic regression model was estimated because sample subjects were nested within grandparents. A three-level analysis with an additional parent

level was unnecessary as only one child per family was included, resulting in no variance at the parent level. As described above, the analyses were performed by running 100 simulations, each time randomly selecting one child per family as sample members. In four additional analyses, offending risk for men and women was estimated both for having offending brothers or offending sisters. Having at least one offending brother or sister was compared to no offending brothers or sisters. These analyses were also performed by running 100 simulations and calculating the mean outcomes. For each analysis, one male or female child per family was randomly selected as sample member. Individuals without siblings of at least 18 years old were left out of these analyses. In order to investigate the role of age difference, multiple logistic regression analyses were performed, each time including siblings who differ either more or less than a certain number of years (2 and a half, 3, and 4 years difference).

Results

Table 1 shows the descriptive statistics of the dependent and independent variables for the total sample of 924 individuals. As can be seen in the table, a minority of 27% of the sample committed at least one offence on average in the first 27 years of his or her life. Similarly, 27% of the sample members had at least one sibling who offended. However, most sample members (57%) did not have offending siblings, while the remainder had no siblings (10%) or only siblings under age 18 (7%). About half of the fathers and grandfathers had committed at least one offence up until the time of data collection, compared to 17% of the mothers and 24% of the grandmothers. These percentages are higher than in the general population, which confirms the high-risk character of the sample.

Table 1 Descriptive statistics on the research group

	Total sample ($N = 924$)
Mean age in 2007	27.3 (St.d. 6,98)
Offended 1+ times	27%
Siblings	
Mean nr. of siblings	1.1 (St.d. 0,75)
Non-offending siblings	57%
No siblings	10%
Siblings under age 18	7%
1+ siblings offended	27%
Parents	
Mother offended	17%
Father offended	53%
Grandparents	
Grandmother offended	24%
Grandfather offended	49%

Table 2 Numbers and percentages of non-offenders and offenders, distinguished between sibling categories

Type of sibling(s)	Non-offender	Offender	Total
Non-offending sibling(s)	399 (76%)	123 (24%)	522 (100%)
Without siblings	64 (69%)	29 (31%)	93 (100%)
Only underage sibling(s)	46 (74%)	16 (26%)	62 (100%)
One or more offending sibling(s)	161 (65%)	86 (35%)	247 (100%)

Table 2 shows the percentage of offenders among sample members with non-offending sibling(s), no siblings, only underage sibling(s), and one or more offending sibling(s). It shows that 35% of the individuals with at least one offending sibling had ever offended compared to 24% of the individuals with non-offending sibling(s), 31% of individuals without siblings, and 26% of individuals with young siblings.

The results of the main multi-level logistic regression models are presented in Table 3. As can be seen in model 1, both having no siblings (odds ratio (OR) = 1.85, standard error (S.E.) = 0.31) and having siblings who offended (OR = 2.02, S.E. = 0.30) significantly increased the risk of offending as compared to having non-offending siblings. As having siblings who offended increased the risk of offending, this confirms hypothesis 1. Model 2 includes the parental and grandparental offending variables, showing significant associations for all predictors, except grandmother offending. Model 3 includes sibling offending, as well as parental and grandparental offending. Model 3 shows, compared to model 1, a reduced but still significant odds ratio of sibling offending (OR = 1.73, S.E. = 0.30), supporting hypothesis 2. Having a criminal

Table 3 Multilevel logistic regression analyses with effects on offending

	Model 1 (N = 496)		Model 2 (N = 496)		Model 3 (N = 496)	
	Exp(b)	S.E.	Exp(b)	S.E.	Exp(b)	S.E.
Age	1.42*	0.15	1.37*	0.14	1.42**	0.15
Age*age	0.99*	0.00	0.99*	0.00	0.99	0.00
Man vs. Woman	6.67**	0.28	6.70**	0.27	7.32**	0.27
Type of sibling(s)						
Non-offending sibling(s) (ref.)	(Ref.)				(Ref.)	
Without siblings	1.85*	0.31			1.67*	0.31
Only underage sibling(s)	2.00	0.42			2.16*	0.42
One or more offending sibling(s)	2.02**	0.30			1.73*	0.30
Mother offended			2.31**	0.29	2.18**	0.30
Father offended			1.58*	0.24	1.57*	0.24
Grandmother offended			1.14	0.27	1.12	0.28
Grandfather offended			1.61*	0.23	1.57*	0.24

Note: Results in the model are the mean results of 100 simulations. The N is each simulation's sample, selecting one child per family, which adds up to 496 individuals out of a total N of 924. The standard errors, based on an N of 496, are therefore high estimates

*$p < .05$ one-sided; **$p < .01$ one-sided

mother increased the risk of offending (OR = 2.18, S.E. = 0.30) more than having a criminal father (OR = 1.57, S.E. = 0.24) or having a criminal sibling. Table 3 also shows that being older is associated with a higher risk of having offended (OR = 1.42, S.E. = 0.15) and that male sample members are at increased risk of offending, compared to female sample members (OR = 7.32, S.E. = 0.27). One of the most striking results shown in Table 3 is the increased risk of offending for individuals without siblings (OR = 1.67, S.E. = 0.31) and individuals with only siblings under age 18 (OR = 2.16, S.E. = 0.42), compared to individuals with non-offending siblings. It seems that it is not so much sibling offending that increased the offending risk of individuals, but having no siblings who offended that decreased the risk of offending.

In order to investigate hypothesis 3a, the effects of having offending brother(s) and having offending sisters are estimated separately. This is done for both male and female individuals separately, in order to also investigate hypothesis 3b. Table 4 shows that the risk of having offended is elevated for both men and women when brother(s) have offended. In contrast to hypothesis 3a, having a brother who offended is not a greater risk factor for men than for women. Having a sister who offended also significantly elevated offending risk for men and women. In line with hypothesis 3b, these odds ratios were larger than those for having an offending brother. However, these odds ratios were based on small sample sizes, have large standard errors, and do not significantly differ from the other odds ratios.

In order to investigate hypothesis 4, the role of age difference between siblings was investigated in a number of analyses, each time comparing offending risk for more or less than two and a half, 3, or 4 years in age difference. The analyses did not show a consistent pattern and no significant differences were found. For example, individuals with siblings who differed less than 4 years were only barely significantly at risk of offending (OR = 1.60, S.E. = 0.28), which was comparable to individuals who differed more than 4 years (OR = 2.06, S.E. = 0.43).

Discussion

The main goal of this study was to examine the effect of sibling offending on individuals' offending. The results showed that sibling offending, over and above parental and grandparental offending, elevated the risk of offending for individuals, supporting hypothesis 1. Thus, this study not only points to intergenerational transmission, but also to intragenerational transmission of offending between siblings.

Table 4 Four logistic regression analyses with effects on offending by gender

	N	Men		N	Women	
		Exp(b)	S.E.		Exp(b)	S.E.
1+ brothers offended (vs. 0)	123	2.03*	0.38	214	2.44*	0.46
1+ sisters offended (vs. 0)	214	2.20*	0.44	90	4.74*	0.77

Note: All models control for age and age^2

*$p < .05$ one-sided; **$p < .01$ one-sided

This study confirms results of earlier studies (e.g. [24, 25]) that identified a relationship between parental and offspring offending. In addition, having a grandfather who offended was also associated with an increased risk of offending; this effect existed over and above the risk incurred from having criminal parents. This finding is in line with Frisell et al. [12] who reported a significant association between violent offending of grandparents and grandchildren. Although these effects were strong, especially for mothers, they only modestly accounted for sibling effects on offending. Previous studies could not rule out alternative explanations, such as that similarity in sibling offending is attributable to the sharing of deviant parents or a shared deviant family "culture". In our study, the fact that the risk increase from sibling offending remains significant after including parental and grandparental offending suggests that this is not the case. This study did not specifically investigate genetic influences in the transmission of offending within families. However, our results show significant associations between parental, grandparental, and sibling offending with individual offending, which is in line with the high heritability estimates found in genetic studies (e.g. [10]).

In this study, age difference between siblings did not influence the relationship between sibling offending and offending risk. This is not in line with the results from Kendler et al. [15]. However, in that particular study, all Swedish siblings born between 1950 and 1991 were studied resulting in a very large sample and age difference between siblings were only modestly related to associations in offending between siblings. Such modest associations would likely stay undetected in smaller samples, such as in this study.

A second and striking finding is that individuals without siblings showed a higher risk of offending than individuals with non-offending sibling(s). That elevated risk was comparable to the risk of having offending sibling(s). An explanation for this finding may be that sibling offending does not constitute a risk factor per se, but that having non-offending siblings is a protective factor. This may be particularly relevant in a high-risk sample, where offending is quite common. Another explanation may be that families with one child are more often families that experienced divorce (because divorce prevented another child from being born), which is a known correlate not only of parental offending (e.g. [6, 28]) but also of offspring offending (e.g. [11]). Indeed, divorce seems to be related to having no siblings as 27% of the individuals without siblings have divorced parents, compared to only 12% of the individuals with non-offending siblings and 21% of the individuals with offending siblings. However, this does not explain the significant effect of having siblings under age 18.

Earlier studies focused on investigating brother-brother and sister-sister similarities. This study adds to the literature by separately investigating the risk of having offending sister(s) and brother(s) for both men and women. Having offending brothers is associated with an increased risk of offending for both men and women, as well as having offending sisters. We found no support for our same-gender hypothesis, namely that having an offending sibling of the same gender constitutes a greater risk for offending than having an offending sibling of the other gender. Although offending risk was especially high for women with offending sisters, the gender differences were not significant.

Offending mothers generated the largest increase in offending risk in this study's main analyses. An explanation for this finding could be that female offending is uncommon and, thus, a marker of considerable family deviance. This could also explain the high offending risk for women with offending sisters. Another explanation is that the mothers in this study were probably often housewives. Over 60% of Dutch

women born in 1945–1964 were housewives [7], assumed the role of caregiver more often than the fathers, and were therefore possibly more influential on the children than fathers were. However, female offending in the family did not necessarily produce greater risks of offending, as most differences with male offending were not significant, but this is possibly a power issue as well.

In this study, we were able to measure offending over an extensive period in time, without methodological differences. The data were collected from official records and were therefore not subject to memory and social desirability distortions. The high-risk nature of the sample made it possible to find effects that otherwise might have stayed undetected. On the other hand, the design of the sample implies that it is not representative for the total Dutch population, so further research is needed to find out whether the results hold for the total population or other samples than used in this study. Especially the findings that point to non-offending of siblings being a protective factor rather than offending of siblings being a risk factor, should perhaps be seen against this light. Furthermore, due to the official nature of the data, only a limited number of variables were available for inclusion in the analyses. More information about the social environment and, in particular, the relationship with siblings, parents, and peers could help further explain sibling similarity in offending. In addition, it was not possible to establish causality for any of the associations, and results should therefore be interpreted as associations rather than causal effects. Finally, using registered crime data leads to an underestimation of the actual number of crimes committed. It is to be expected that certain individuals run a higher risk of getting caught. This could especially be problematic if specific families are more intensely monitored by the police and therefore all family members run a higher risk of being caught than others [4].

In conclusion, this study showed that siblings have a tendency to be similar in their offending behaviour. Although the exploratory nature of this study requires caution in drawing conclusions or formulating policy implications and more research is needed to identify the exact mechanisms at play, some attention points can be formulated. This study highlights that focusing only on children of criminal parents is not enough. Our study shows how almost each and every subsequent offending family member adds risk for children to offend as well: grandfathers, fathers, mothers, and siblings. Sibling criminality appears to be a risk factor in its own right. "Like father, like son" appears to be an overly simplistic idiom to explain the dynamics of family offending; "Like mother, like son" may already be an improvement, but perhaps "All in the family" would actually capture what happens most accurately.

References

1. Bandura, A. (1977). *Social learning theory*. Englewood Cliffs: Prentice-Hall.
2. Beaver, K. M. (2013). The familial concentration and transmission of crime. *Criminal Justice and Behavior, 40*(2), 139–155.

3. Besemer, S., & Farrington, D. P. (2012). Intergenerational transmission of criminal behaviour: conviction trajectories of fathers and their children. *European Journal of Criminology, 9*(2), 120–141.
4. Besemer, S., Farrington, D. P., & Bijleveld, C. C. J. H. (2013). Official bias in intergenerational transmission of criminal behaviour. *British Journal of Criminology, 53*, 438–455.
5. Bijleveld, C. C. J. H., & Wijkman, M. D. S. (2009). Intergenerational continuity in convictions: a five-generation study. *Criminal Behaviour and Mental Health, 19*, 142–155.
6. Blokland, A. A. J., & Nieuwbeerta, P. (2005). The effects of life circumstances on longitudinal trajectories of offending. *Criminology, 43*(4), 1203–1240.
7. Dutch Statistics (2000). "Traditionele vrouwen sterk op retour" ['Traditional' women strongly diminishing in numbers]. Retrieved from https://www.cbs.nl/nl-nl/nieuws/2000/44/traditionele-vrouwen-sterk-op-retour.
8. Fagan, A., & Najman, J. (2003). Sibling influences on adolescent delinquent behaviour: an Australian longitudinal study. *Journal of Adolescence, 26*, 547–559.
9. Farrington, D. P., Jolliffe, D., Loeber, R., Stouthamer-Loeber, M., & Kalb, L. M. (2001). The concentration of offenders in families, and family criminality in the prediction of boys' delinquency. *Journal of Adolescence, 24*, 579–596.
10. Ferguson, C. J. (2010). Genetic contributions to antisocial personality and behavior: a meta-analytic review from an evolutionary perspective. *The Journal of Social Psychology, 150*(2), 160–180.
11. Fergusson, D. M., Horwood, L. J., & Lynskey, M. T. (1992). Family change, parental discord and early offending. *Journal of Child Psychology and Psychiatry, 33*(6), 1059–1075.
12. Frisell, T., Lichtenstein, P., & Langström, N. (2011). Violent crime runs in families: a total population study of 12.5 million individuals. *Psychological Medicine, 41*(1), 97–105.
13. Junger, M., Greene, J., Schipper, R., Hesper, F., & Estourgie, V. (2013). Parental criminality, family violence and intergenerational transmission of crime within a birth cohort. *European Journal on Criminal Policy and Research, 19*(2), 117–133.
14. Kendler, K. S., Ohlsson, H., Sundquist, K., & Sundquist, J. (2013). Within-family environmental transmission of drug abuse: a Swedish national study. *JAMA Psychiatry, 70*(2), 235–242.
15. Kendler, K. S., Morris, N. A., Lönn, S. L., Sundquist, J., & Sundquist, K. (2014). Environmental transmission of violent criminal behaviour in siblings: a Swedish national study. *Psychological Medicine, 44*, 3181–3187.
16. Kruttschnitt, C. (1996). Contributions of quantitative methods to the study of gender and crime, or bootstrapping our way into the theoretical thicket. *Journal of Quantitative Criminology, 12*(2), 135–161.
17. Lauritsen, J. L. (1993). Sibling resemblance in juvenile delinquency: findings from the National Youth Survey. *Criminology, 31*(3), 387–409.
18. Maccoby, E. E. (1990). Gender and relationships: a developmental account. *American Psychologist, 45*(4), 513–520.
19. Moffitt, T. E. (2005). The new look of behavioral genetics in developmental psychopathology: gene-environment interplay in antisocial behaviours. *Psychological Bulletin, 131*, 533–554.
20. Reiss, A. J., & Farrington, D. P. (1991). Advancing knowledge about co-offending: results from a prospective longitudinal survey of London males. *Journal of Criminal Law and Criminology, 82*, 360–395.
21. Rowe, D. C., & Farrington, D. P. (1997). The familial transmission of criminal convictions. *Criminology, 35*, 177–201.
22. Rowe, D. C., & Gulley, B. (1992). Sibling effects on substance use and delinquency. *Criminology, 30*, 217–233.
23. Slomkowski, C., Rende, R., Conger, K., Simons, R., & Conger, R. (2001). Sisters, brothers and delinquency: evaluating social influence during early and middle adolescence. *Child Development, 72*, 271–283.
24. Thornberry, T. P., Freeman-Gallant, A., Lizotte, A. J., Krohn, M. D., & Smith, C. A. (2003). Linked lives: the intergenerational transmission of antisocial behavior. *Journal of Abnormal Child Psychology, 31*, 171–184.
25. Van de Rakt, M., Nieuwbeerta, P., & de Graaf, N. D. (2008). Like father, like son. The relationship between conviction trajectories of fathers and their sons and daughters. *British Journal of Criminology, 48*, 538–556.
26. Van de Rakt, M., Nieuwbeerta, P., & Apel, R. (2009). Association of criminal convictions between family members: Effects of siblings, fathers and mothers. *Criminal Behaviour and Mental Health, 19*, 94–108.
27. Van de Weijer, S. G., Bijleveld, C. C. J. H., & Blokland, A. A. J. (2014). The intergenerational transmission of violent offending. *Journal of Family Violence, 29*(2), 109–118.
28. Van Schellen, M. (2012). *Marriage and crime over the life course: the criminal careers of convicts and their spouses*. Utrecht: Utrecht University.
29. Vaske, J., Wright, J. P., Boisvert, D., & Beaver, K. M. (2011). Gender, genetic risk, and criminal behaviour. *Psychiatry Research, 185*(3), 376–381.
30. West, D. J., & Farrington, D. P. (1977). *The delinquent way of life*. London: Heinemann.