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ORIGINAL PAPER

Differential Parental Treatment, Sibling Relationships and Delinquency in Adolescence

Ron. H. J. Scholte · Rutger C. M. E. Engels · Raymond A. T. de Kemp · Zeena Harakeh · Geertjan Overbeek

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Abstract The present study examined the moderating effect of the quality of the sibling relationship on the longitudinal association of parental treatment with theft, vandalism, and violence in adolescence. Participants were 416 sibling pairs which were studied over a one-year period. The younger siblings were aged 13 to 15, the older siblings 14 to 17 at Time 1. No significant effects were found for mixed-sex dyads. For same-sex dyads, the results suggested that when the relationship was of poor quality, younger boys who felt treated less favorably by their mothers were most likely to show high levels of vandalism and violence, while younger girls who felt treated less favorably were most likely to show high levels of theft. No such effects were found for older siblings. These findings indicate that differential parental treatment and the quality of the sibling relationship have gender-specific effects on adolescents' delinquency and have a different meaning for younger than for older siblings.

Keywords Differential parental treatment · Sibling relationships · Adolescent delinquency · Gender differences

Ron H. J. Scholte received his PhD in 1998. His research interests focus on two areas of adolescent adjustment. The first area concerns the association between parent-child and peer relationships and well-being, with a specific focus on bullying and victimization. The second area concerns adolescent substance use and the role that parents, siblings, and peers play. Primary attention is given here to the gene by environment interactions that may predict alcohol use and smoking.

R. H. J. Scholte (✉) · R. C. M. E. Engels · R. A. T. de Kemp · Z. Harakeh · G. Overbeek
Behavioral Science Institute, University of Nijmegen, Montessorilaan 3, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands
e-mail: r.scholte@pwo.ru.nl

It has been shown that children raised in the same family are not necessarily similar to each another (Plomin and Daniels, 1987). In fact, it is believed that siblings are not more similar to each other than they are to children from other families (Turkheimer and Waldron, 2000). One important family factor that may contribute to this dissimilarity is differential parental treatment. Differential parental treatment refers to the fact that children within the same family are treated differently by their parents or may perceive their treatment differently (Plomin *et al*., 2001). Various studies have revealed that differential parental treatment is related to children's and adolescents' externalizing problems, such as antisocial behavior (Neiderhiser *et al*., 1999; Reiss *et al*., 1995). The general conclusion from these studies is that those siblings who are treated less favorably show lower levels of adjustment. However, previous research has focused primarily on the direct association between differential parental treatment and broad measures of externalizing problem behavior, and has relatively neglected the possible role of moderators. Therefore, the aim of the present study was to examine whether the association between differential parental treatment and adolescent delinquency was moderated by the quality of the sibling relationship.

Various theoretical orientations have been used to understand the association between differential parental treatment and differences in siblings' adjustment. These orientations include social information processing models (Crick and Dodge, 1994), the social comparison model (Festinger, 1954), and the distributive justice framework (Deutsch, 1985), which all suggest that siblings are not passive recipients of parental treatment but actively construct their own experiences. Our theoretical assumption in the present study was in line with these orientations, as we assumed that siblings rather actively observe, evaluate, and judge their own parental treatment compared to other siblings' treatment.

Thus, we argued that it is the subjective experiences of differences in parental treatment that will be related to adjustment. Although the main effects of differential parental treatment, especially with respect to internalizing behavior, are well described now, possible moderators of differential parental treatment have received far less attention in research. This issue may be highly relevant, given that differential parental treatment usually accounts for only a small percentage of the explained variance in adjustment measures (Turkheimer and Waldron, 2000). This suggests that the direct link between differential parental treatment and outcomes is usually rather weak and that the prediction of adjustment may be enhanced by taking other factors into consideration (Kowal *et al*., 2002).

Previous research on differential parental treatment has told us little about possible moderators of the association between differential parental treatment and adjustment. Nevertheless, for several reasons the quality of the sibling relationship may constitute an important moderator of this association. Studies have elucidated the influential role of siblings, especially same-sex siblings, in adolescents' delinquency. It is hypothesized that a low quality sibling relationship, characterized by frequent conflictual and coercive interactions, may set the stage for training adolescents in antisocial behavior, including delinquency (Bank *et al*., 1996; Patterson, 1984, 1986). An increasing number of studies have provided support for this model. For example, Slomkowski *et al*. (2001) revealed that hostile interactions with older siblings predicted younger siblings' delinquency, both for sister and brother sibling pairs. Other studies came to similar conclusions and reported that conflict in sibling relationships in childhood was related to an increase in delinquency in early adolescence (Stocker *et al*., 2002). Thus, it becomes clear that the sibling relationship represents an important correlate of adolescent delinquency. However, the sibling relation may not only be directly related to adolescent delinquency, but also indirectly, through moderation of the association between differential parental treatment and delinquency.

In addition, family subsystems (e.g., parent-child relationships, sibling relationships) are not independent entities but are interconnected and simultaneously affect an individual family member (Minuchin, 1985, 1988). This implies that the effects of parent-child interactions may be moderated by the interactions or relationships that child has with other family members, such as a sibling. Also, individuals tend to compare their situation with that of others, possibly as a means to self-enhancement (Festinger, 1954). As the work by Adler (1929) and, more recently, Feinberg *et al*. (2000) has shown, social comparison processes not only operate outside families, but may be particularly strong between siblings within the same family, especially in terms of parental treatment. The effects of comparing one's own parental treatment with that of a sibling's may be dependent on the quality of the relationship that exists between the siblings. From a theoretical standpoint we may expect that, for example, siblings' feelings of rivalry and jealousy can substantially influence the effects of differential parental treatment. If an adolescent has a highly rivalrous relationship with his sibling, feeling that that sibling is favored may have a totally different meaning compared to when the sibling relationship is warm and supportive.

Research on the differential parental treatment and the sibling relationship exists, but it has studied the sibling relationship usually as an outcome variable. The work by Brody (Brody *et al*., 1987; Brody *et al*., 1992a) has shown that differential maternal affection or control is linked to more negativity in the sibling relationship in childhood. Other studies reported similar findings for adolescents (McHale and Pawletko, 1992). Brody *et al*. (1992b) extended this research by also examining paternal differential treatment. They found that even though fathers and mothers did not differ in the rates of differential behavior, fathers' differential behavior appeared to have specific importance for the sibling relationships. Although it can be hypothesized that the quality of the sibling relation moderates the association between differential parental treatment and adjustment, empirical studies on this issue are currently lacking.

Previous studies on differential parental treatment have been informative, but a number of issues have been relatively neglected so far. First, research on differential parental treatment has usually not taken into account the absolute level of parenting (i.e., the level of warmth or control that children perceive from their parents) in the families. This is important because the absolute level of warmth has been found to be related to externalizing behavior such as aggression and antisocial behavior (e.g., Gray and Steinberg, 1999; Kazdin, 1996; Scaramella *et al*., 1999). In order to understand the significance of differential parental treatment for adolescent adjustment it may not be enough to just examine the differential parental treatment, but one would also have to know the absolute level of parenting. The few studies on differential parental treatment in adolescence that have controlled for the absolute level have yielded mixed results. Examining same-sex sibling pairs, Feinberg and Hetherington (2001) reported that after controlling for absolute level of warmth, higher levels of warmth relative to a same-sex sibling were significantly related to fewer behavior problems, while lower levels of warmth were related to more problem behaviors. In contrast, Tamrouti-Makkink *et al*. (2004) found no direct association between differential parental treatment and adolescent adjustment beyond the absolute level of parental affection in same-sex sibling pairs.

Second, the role of fathers has been relatively understudied. Most studies on differential parental treatment focus on mothers (e.g., McGuire *et al*., 1995; McHale and Pawletko, 1992) or aggregate maternal and paternal parenting into one

overall parenting score (e.g., Feinberg *et al*., 2000; Kowal and Kramer, 1997; Kowal *et al*., 2002). Only recently have studies begun to also include fathers. These studies reveal that parents tend to favor children of the same sex (Tucker *et al*., 2003; McHale *et al*., 2000). Furthermore, including gender of the parent in addition to gender of the child may be highly relevant, because research suggests that adolescent girls seem to be especially vulnerable to disfavored treatment perceived from fathers, especially with respect to self-esteem (McHale *et al*., 2000).

Third, studies on differential parental treatment have usually not differentiated between older and younger siblings. Birth order may be an important factor with respect to the effects of differential parental treatment on adolescent adjustment. It has been found that differential treatment usually takes the form of favoritism towards the younger sibling and holds for mothers as well as fathers (McHale *et al*., 1995). Nevertheless, the empirical literature on birth order differences in reactions to differential parental treatment is not consistent, which may be due to the different adjustment domains or the different age groups that were studied. While Tamrouti-Makkink *et al*. (2004) found that differential parental treatment was linked to older siblings' externalizing behavior in adolescence, McHale *et al*. (1995) found that in childhood younger siblings were more vulnerable to differential parental treatment and reported lower levels of well-being when being disfavored.

The present study

The aim of the present study was to examine the longitudinal associations between differential parental treatment, the quality of the sibling relation, and their interaction on the one hand, and delinquency in adolescence on the other. Delinquency constitutes a major societal problem (e.g., Federal Bureau of Investigation, 2001) and figures show an increase in adolescent criminal offenses (Acoca, 1999). It is particularly relevant to examine changes in delinquency in early and middle adolescence, since opportunities for delinquent behavior are most prominent during this period (Moffitt *et al*., 1996). As Moffitt (1993) has described, early and middle adolescence is characterized by sharp increases in delinquency, even over periods as short as one year. According to Moffitt, these acts of delinquency reflect adolescents' attempts to establish some sense of autonomy and maturity, which becomes prominent in adolescence. Our study is one of the first to longitudinally examine whether differential parental treatment contributes to differences in problem behavior later in time. With respect to delinquency, the Conger and Conger (1994) study seems to be one of the few studies that addressed the issue. Their findings suggested that differential parental hostility affected changes in sibling delinquency two years later, but the study did not examine whether differential parental treatment was significant beyond the effect of the level of parenting directed towards each sibling separately.

We had a number of hypotheses. First, we hypothesized that the adolescents who felt treated less positively by their parents compared to their siblings would show higher levels of delinquency than the adolescents who felt treated more positively. Given that gender differences exist in the display of delinquent acts (Moffitt *et al*., 2001; Zahn-Waxler and Polanichka, 2004), we expected that differential parental treatment would be more strongly related to overt and physical aggression in boys, and to covert delinquency (i.e., theft) in girls. As some studies showed that second-borns are more vulnerable to differential parental treatment (Feinberg *et al*., 2000; McHale *et al*., 1995), we expected that this association would be stronger for younger than for older siblings. Furthermore, we hypothesized that effects of differential parental treatment would be moderated by the quality of the sibling relationship. That is, on the basis of Patterson's (1984) model we hypothesized that disfavored adolescents would show lower levels of delinquency when they had a positive sibling relationship than when they had a negative relationship. This association was again expected to be stronger for younger siblings than for older siblings, also because younger siblings seem to be more affected by the sibling relationship than older siblings (Slomkowski *et al*., 2001).

Method

Participants

A total of 416 Dutch intact families participated in the present study (for more details of the study, see Harakeh *et al*., 2005; van der Vorst *et al*., 2005). Each family consisted of a mother, father and two adolescent children between the ages of 13 and 17. The baseline assessment (T1) took place between November 2002 and April 2003 with 428 participating families. The follow-up assessment (T2) took place exactly one year later. Attrition between T1 and T2 was very low ($n = 12$ families, 3%), resulting in a longitudinal sample of 416 families. In these families there were 216 same-sex sibling pairs (108 male pairs and 106 female pairs) and 200 mixed-sex sibling pairs.

Most of the family members were of Dutch origin (i.e. 98% of the children, 97.3% of the mothers, and 96.2% of the fathers). At T1, the age of the older children was between 14 and 17 years ($M = 15.22$, $SD = .60$) and of the younger children between 13 and 15 years ($M = 13.35$, $SD = .50$). Mothers' age varied between 35 and 56 years ($M = 43.85$, $SD = 3.56$) and fathers' age between 37 to 62 years ($M = 46.20$, $SD = 4.01$). Among the older children 53.1% were male and among the younger children 47.6% were

male. Approximately similar numbers of children came from low, middle and high educational levels. With regard to parents' educational level, 1.4% of the mothers and 1.2% of the fathers had attended primary school only; 8.2% of the mothers and 11.3% of the fathers had finished low level of education; 53.1 of the mothers and 36.2% of the fathers had finished middle level education; while 36.5% of the mothers and 50.5% of the fathers had a high level education. Among the participating families, 18.4% of the mothers and 2.6% of the fathers were unemployed.

Procedure

The addresses of 5,602 families with at least two adolescent children were obtained from the local registers of 22 municipalities in the Netherlands. These families were sent a letter in which they were informed about the study and were asked to return the included consent response form if they were willing to participate and fulfilled the participation criteria. Of the 981 families (18%) who returned the response form, 216 families did not fulfill the inclusion criteria or could not be contacted due to missing information, which resulted in a total of 765 families that fulfilled the participation criteria. Because our financial resources allowed to include 428 families in the study, we selected this number out of the 765 families, in the way that we obtained a) approximately equal numbers of boy-boy, boy-girl, girl-boy, and girl-girl sibling dyads, and b) equal numbers of children from lower, middle, and higher educational levels. The latter was important to avoid any confounding effects of educational level on health behaviors, which was the general aim of the project. No differences in the selection characteristics existed between the families that were selected and that were dropped. Interviewers visited the 428 families at their homes and during these home visits each family member filled in the questionnaire individually and independently. Completion of the questionnaire took approximately 90 min. At each measurement wave, each family received 30 euros when all four family members filled in the questionnaires.

Measures

Perceived differential parental treatment

The Differential Affection and Differential Control scales of the Sibling Inventory of Differential Experience (SIDE; Daniels and Plomin, 1985) were used to assess perceived differential parental treatment. Adolescents rated on a five-point scale (1 = 'applies more to my sister/brother' 2 = 'applies a little more to my sister/brother,' 3 = 'applies equally to me and my sister/brother,' 4 = 'applies a little more to me,' 5 = 'applies more to me') how their mothers and fathers treated them compared to their siblings. The Affection scale consisted of five items tapping parental pride, interest, favoritism, enjoyment, and sensitivity. The Control scale contained four items measuring parental strictness, punishment, blame, and discipline. To avoid multicollinearity among the two differential parental treatment scales, a composite measure was constructed by recoding the Control items and summing them with the Affection items. The composite scale reflected the magnitude of adolescent's perceived difference in parental treatment, with a higher score indicating that the adolescent felt treated more positively than his or her sibling. We used the measure of differential parental treatment as a continuous scale because we expected that feeling favored and feeling disfavored would be differently related to delinquency. Reliabilities for younger siblings' perceived differential parental treatment from mothers and fathers were $\alpha = .74$ and .64, respectively, and for older siblings .71 and .64, respectively.

Parental warmth

Absolute levels of maternal and paternal warmth were assessed using the Warmth scale of the Relational Support Inventory (RSI; Scholte *et al.*, 2001). Adolescents rated on a five-point scale (1 = 'totally not true,' 2 = 'not true,' 3 = 'sometimes true, sometimes not true,' 4 = 'true,' 5 = 'totally true') how much each of the six items (e.g., 'my mother/father shows me that she loves me') held for them. The scale indicates the level of warmth and support adolescents perceived from their mothers and fathers. The alpha reliabilities of the younger siblings' maternal warmth and paternal warmth scales were .68 and .78, respectively, while they were .69 and .80 for maternal and paternal warmth perceived by older siblings.

Quality of the sibling relationship

Six self-report scales from the Sibling Relationship Questionnaire (SRQ; Furman and Buhrmester, 1985) were used to assess adolescents' perceptions of the sibling relationship quality. These scales tapped intimacy, prosocial behavior, companionship, similarity, admiration given to sibling, and admiration received from sibling, and were measured on a five-point scale (1 = 'never,' 2 = 'hardly,' 3 = 'sometimes,' 4 = 'often,' 5 = 'very often'). These six scales were aggregated into one overall scale, with a reliability of $\alpha = .87$ for the younger sibling and $\alpha = .88$ for the older sibling. The correlation between the younger and older siblings' perceptions of the quality of the sibling relationship was .57 ($p < .001$).

Table 1 Factor loadings on theft, vandalism, and violence for younger and older siblings on T2

Variable	Younger siblings			Older siblings		
	Theft	Vandalism	Violence	Theft	Vandalism	Violence
Stealing < €24	**.92**	.32	.33	**.87**	.11	− .01
stealing > €24	**.87**	.20	.46	**.84**	.10	.15
Shoplifting	**.83**	.37	.24	**.69**	.16	.08
Damaging school property	.32	**.81**	.10	.17	**.79**	.23
Damaging public property	.24	**.78**	.46	.07	**.73**	.22
Damaging property of peers	.28	**.73**	.11	.12	**.70**	.23
Setting fire	.15	**.66**	.33	.18	**.50**	.53
Involved in fighting	.24	.29	**.84**	.14	.35	**.87**
Involved in hooliganism	.33	.25	**.79**	.06	.33	**.85**
Wounded someone	.49	.21	**.73**	.03	.12	**.73**
Mean	1.08	1.23	1.08	1.06	1.21	1.09
Standard deviation	.26	.44	.27	.25	.36	.31

Note. stealing < (>) € 24: stealing items worth less (more) than 24 Euro's. Factor loadings that constitute a scale are printed in bold.

Delinquency

Adolescents' delinquency was assessed using 10 self-report questions, inquiring about how often each adolescent had participated in a variety of delinquent acts during the previous 12 months. Items were answered on a five-point scale, ranging from 1 ('never'), 2 ('1 to 3 times'), 3 ('4 to 6 times'), 4 ('7 to 12 times') to 5 ('more than 12 times'). Principal component analyses on these 10 items resulted in three factors that reflected *theft* (three items on shoplifting and stealing), *vandalism* (four items on damaging property, breaking and entering, setting fire), and *violence* (three items on physical fighting and beating up someone). Table 1 presents these results of the component analyses on the delinquency as the outcome variable on T2. The internal reliabilities for the younger siblings' scales on T1 (T2) were as follows: theft $\alpha = .71$ (.82), vandalism $\alpha = .72$ (.73), and violence $\alpha = .69$ (.69). For the older siblings, the reliabilities were $\alpha = .58$ (.72) for theft, $\alpha = .69$ (.73) for vandalism, and $\alpha = .76$ (.74) for violence. Self-report questionnaires for assessing delinquent behaviors in adolescence have been widely used and are considered to be a valid and reliable method (Moffitt *et al*., 1996).

Strategy of analyses

A series of hierarchical regression analyses were conducted to examine the hypothesized moderating role of the quality of the sibling relationship on the association between perceived differential parental treatment and theft, vandalism, and violence one year later, controlling for the absolute level of parental warmth and delinquent behavior at Time 1. The regression analyses were performed separately for younger and older siblings within male and female same-sex and mixed-sex sibling pairs, and separately for variables perceived from mothers and from fathers. In the first step of each analysis, the score on T1 theft, vandalism, or violence was entered. In the second step, the absolute level of perceived warmth was entered. In the third step, differential parental treatment and quality of the sibling relationship were added to the equation. In the fourth step, the interaction between differential parental treatment and quality of the sibling relationships was entered. The variables used in the interaction term were centered (computed as deviations from their respective means) to reduce multicollinearity. Significant interactions were tested following the procedure suggested by Aiken and West (1991). Following this procedure, the relation between differential parental treatment and the

Table 2 Means and standard deviations on T1 and T2 theft, vandalism, and violence, for younger and older siblings, and boys and girls

	T1			T2		
	Theft	Vandalism	Violence	Theft	Vandalism	Violence
Younger Siblings						
Girls	1.05	1.15	1.05	1.06	1.14	1.03
	(.24)	(.28)	(.21)	(.32)	(.26)	(.12)
Boys	1.03	1.27	1.13	1.09	1.33	1.13
	(.18)	(.49)	(.34)	(.39)	(.56)	(.36)
Older Siblings						
Girls	1.07	1.16	1.04	1.06	1.13	1.03
	(.33)	(.33)	(.18)	(.29)	(.25)	(.11)
Boys	1.06	1.31	1.14	1.07	1.29	1.14
	(.22)	(.48)	(.35)	(.21)	(.43)	(.41)

Note. Standard deviations are given between parentheses.

Table 3 Correlations between delinquency, parental warmth, differential parental treatment (Dpt), and quality of the sibling relationship for younger and older siblings

	1	2	3	4	5	6	7	8
1. Theft		.36**	.22**	−.12*	−.23**	.01	−.17**	−.08
2. Vandalism	.36**		.49**	−.11*	−.26**	−.05	−.17**	−.10*
3. Violence	.45**	.53**		−.03	−.03	.03	−.14**	−.02
4. Warmth mother	−.07	−.17**	−.09		.60**	.03	.20**	.30**
5. Warmth father	−.10*	−.19**	−.10*	.59**		−.03	.31**	.30**
6. Dpt mother	−.15**	−.12*	−.11*	.25**	.09		−.14**	.11*
7. Dpt father	−.05	−.10*	.01	.12*	.19**	.42**		.02
8. Quality sibling relationship	−.08	−.22**	−.15**	.36**	.30**	.08	.07	

Note. Under the diagonal the correlations for the younger siblings, above the diagonal for the older siblings.
Dpt: differential parental treatment.
*$p < .05$, **$p < .01$.

different forms of delinquency was estimated in the form of an unstandardized beta coefficient at three levels (− 1 *SD*, 0, and + 1 *SD*) of the moderator (quality of the sibling relation). Interpretation of the interactions was based on comparison of the slopes of the regression lines representing low quality sibling relationship (1 *SD* below the mean), mean, and good sibling relationship (1 *SD* above the mean).

Results

Preliminary analyses

To examine whether boys and girls differed on delinquency, ANOVA's were used to compare the means of younger boys with those of younger girls, and of older boys and with those of older girls. The means are given in Table 2. The analyses indicated that no sex differences between younger boys and younger girls existed for theft at Time 1 and Time 2. Younger boys scored higher than girls on vandalism at Time 1, $F(1,415) = 11.07$, $p < .001$, and Time 2, $F(1,415) = 23.43$, $p < .001$, and on violence at Time 1, $F(1,415) = 7.55$, $p < .01$, and $F(1,415) = 16.97$, $p < .001$. For older boys and girls, similar sex differences were found. Older boys and girls scored similarly on theft, but older boys scored higher on vandalism, at Time 1, $F(1,415) = 15.83$, $p < .001$, and Time 2, $F(1,415) = 21.16$, $p < .001$, and on violence at Time 1, $F(1,415) = 13.01$, $p < .001$, and at Time 2, $F(1,415) = 13.55$, $p < .001$. We also tested, using paired *t*-tests, whether there were any differences between the T1 and T2 scores on the three forms of delinquency for younger and older siblings, and for boys and girls. The only difference that existed was found for the younger siblings, who scored higher on T2 theft than on T1 theft ($t = 2.25$, $df = 415$, $p < .05$). Table 3 shows that correlations between the study variables. The correlations between the predictor variables were low to moderate, and thus the variables could be used separately in the regression analyses. As regards the prevalence of delinquency: 34% of the families had no children reporting delinquency, 45% had one child reporting delinquency, and 21% of the families had two children reporting delinquency.

Longitudinal associations between differential parental treatment, quality of the sibling relationship and delinquency at Time 2

A set of hierarchical regression analyses were conducted to examine to what extent Time 2 involvement in theft, vandalism, and violence could be predicted by differential parental treatment and the quality of the sibling relation and their interaction on Time 1.[1] No significant main or interaction effects of differential parental treatment were found in the analyses on the mixed-sex sibling pairs. For the same-sex pairs, however, a number of significant findings emerged from the regression analyses. Tables 4 and 5 present the findings of these regression analyses. For the younger boys it was found that after controlling for initial levels of vandalism or violence, and absolute level of warmth at Time 1 differential parental treatment from mother contributed significantly to the prediction of vandalism and violence at Time 2 (Table 4). In addition, the direct associations between differential parental treatment and the two forms of delinquency were moderated by the quality of the sibling relation (see Step 4). The interaction explained an additional 7% and 10% of the variance in change in vandalism and violence, respectively, over the one year period. The moderation was examined using the procedure recommended by Aiken and West (1991). Comparison of the slopes of the regression lines representing poor (− 1 *SD*), medium (mean), and good sibling

[1] Because some of the delinquency scales were positively skewed, we used a transformation (RANK) for all the scales to obtain a normal distribution and reran the analyses on these transformed scales. Although the proportions of explained variance were slightly lower and the beta's had different values because of the different scaling, the results of the analyses on the transformed scales were similar to the results of the analyses on the initial scales.

Table 4 Regressions predicting Time 2 Delinquency from Time 1 delinquency, parental warmth, differential parental treatment (Dpt), and quality of sibling relation, for same-sex siblings: Younger sibling

	Mother model									Father model								
	Theft			Vandalism			Violence			Theft			Vandalism			Violence		
	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2
Boys																		
Step 1			.00			.16***			.40***			.00			.16***			.40***
Time 1 delinquency	−.04	−.01		.42	.41***		.71	.64***		−.04	−.01		.42	.41***		.71	.64***	
Step 2			.05*			.02			.00			.00			.00			.00
Parental warmth	−.22	−.22*		−.15	−.16		.00	.00		−.04	−.05		−.01	−.01		.04	.05	
Step 3			.02			.11**			.04*			.05			.04			.02
Dpt	.12	.07		−.54	−.32**		−.34	−.22**		.06	.03		−.04	−.02		.26	.13	
Sibling relation	−.10	−.13		−.06	−.09		−.00	−.00		−.17	−.23		−.17	−.23		−.04	−.06	
Step 4			.01			.07**			.10***			.01			.00			.03
Dpt* Sibling relation	−.39	−.16		.84	.38**		.89	.43***		−.42	−.09		.10	.02		.79	.20	
Total R^2			.08			.36			.54			.06			.21			.45
Girls																		
Step 1			.48***			.32***			.23***			.48***			.32***			.23***
Time 1 delinquency	.49	.69***		.58	.57***		.42	.48***		.49	.69***		.58	.57***		.42	.48***	
Step 2			.03*			.02			.00			.00			.01			.00
Parental warmth	−.08	−.18*		.01	.02		−.01	−.02		−.02	−.06		−.01	−.03		−.00	−.01	
Step 3			.01			.01			.01			.04*			.01			.00
Dpt	−.06	−.07		.08	.09		.06	.09		−.10	−.12		.00	.00		.02	.03	
Sibling relation	−.05	−.12		−.00	−.01		.01	.03		−.07	−.18*		.00	.01		.01	.02	
Step 4			.06***			.01			.01			.08***			.02			.02
Dpt* Sibling relation	.42	.30***		.08	.08		.08	.08		.52	.33***		.26	.15		.20	.18	
Total R^2			.58			.36			.25			.60			.36			.25

Note. Dpt: differential parental treatment. Mother model: differential parental treatment and warmth perceived from mother, father model: differential parental treatment and warmth perceived from father.

*$p < .05$, **$p < .01$, ***$p < .001$.

Table 5 Regressions predicting Time 2 Delinquency from Time 1 delinquency, parental warmth, differential parental treatment (Dpt), and quality of sibling relation, for same-sex siblings: Older sibling

	Mother model									Father model								
	Theft			Vandalism			Violence			Theft			Vandalism			Violence		
	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2
Boys																		
Step 1			.10**			.48***			.25***			.10***			.48***			.25***
Time1 delinquency	.29	.31**		.61	.69***		.55	.50***		.29	.31***		.61	.69***		.55	.50***	
Step 2			.01			.00			.00			.00			.01			.02
Parental warmth	.04	.08		−.03	−.03		−.08	−.06		−.01	−.03		.02	.03		−.10	−.12	
Step 3			.03			.01			.00			.05			.01			.01
Dpt	−.03	−.04		.12	.07		.05	.03		−.05	−.06		.06	.04		.14	.08	
Sibling relation	.07	.19		.07	.08		.02	.02		.08	.22*		.06	.07		.03	.03	
Step 4			.00			.00			.00			.04*			.00			.00
Dpt * Sibling relation	.02	.01		.07	.02		−.20	−.05		−.34	−.22*		−.03	−.01		−.20	−.06	
Total R^2			.14			.49			.26			.19			.50			.28
Girls																		
Step 1			.02			.22***			.03			.02			.22***			.03
Time 1 delinquency	.33	.14		.49	.47***		.20	.18		.33	.14		.49	.47***		.20	.18	
Step 2			.00			.00			.01			.00			.01			.05*
Parental warmth	.04	.05		.00	.00		−.02	−.11		.02	.05		−.05	−.12		−.04	−.22*	
Step 3			.00			.06*			.02			.00			.03			.01
Dpt	−.02	−.01		.10	.11		.04	.10		−.01	−.00		.05	.04		.03	.06	
Sibling relation	.01	.02		−.10	−.24*		−.02	−.13		.01	.03		−.07	−.17		−.01	−.08	
Step 4			.00			.01			.01			.00			.02			.00
Dpt * Sibling relation	−.02	−.01		−.11	−.08		−.07	−.11		−.07	−.03		.24	.13		.04	.04	
Total R^2			.03			.29			.07			.02			.28			.09

Note. Dpt: differential parental treatment. Mother model: differential parental treatment and warmth perceived from mother, father model: differential parental treatment and warmth perceived from father.

*$p < .05$, **$p < .01$, ***$p < .001$.

relationship (+ 1 *SD*) indicated that the associations between differential parental treatment perceived from mothers and vandalism and violence were stronger when the boys had a poor relationship with their older brothers than when the relationship was average or good. Thus, younger boys who had a poor sibling relationship displayed were more likely to display higher levels of vandalism or violence when they felt disfavored, but substantially lower levels of vandalism of violence when they felt treated favorably. When the older boys reported an average or good sibling relationship, increases in differential parental treatment were less strongly related to changes in vandalism or violence.

For younger girls, differential parental treatment, the quality of the sibling relation or their interaction at Time 1 turned out to be unrelated to changes in vandalism and violence over time. However, the interaction was significantly related to theft at Time 2, both when the differential parental treatment was perceived from the mother or from the father. Here it was found that the relation of differential parental treatment to theft diminished when the quality of the sibling relationship increased. Thus, girls who reported poor sibling relationships seemed to be most affected by differential parental treatment. When they felt treated disfavorably, they were relatively highly involved in stealing, but when they felt treated favorably, they were less involved in stealing. The effects of differential parental treatment turned out to be weaker when girls reported average or good sibling relationships.

For the older brother and sisters it was found (see Table 5) that after controlling for the absolute level of warmth and the initial level of delinquency on Time 1, in general, the sibling relationship did not moderate the association between Time 1 differential parental treatment and Time 2 delinquency. The only exception was a marginally significant interaction between differential parental treatment from father and the sibling relation in relation to theft in older boys.

Discussion

The general aim of the present study was to examine the longitudinal associations between differential parental treatment, the quality of the sibling relation and their interaction, and three forms of delinquency, while controlling for the absolute level of warmth in the families. The main findings can be summarized as follows. First, no main or interaction effects of differential parental treatment were found in the mixed-sex sibling pairs. Second, the sibling relation moderated the longitudinal associations between differential parental treatment and delinquency, after controlling for the absolute level of warmth in the families. Third, the effects of these interactions were gender-specific. Finally, the birth-order of the siblings was important and showed that younger siblings were more vulnerable for the effects of differential parental treatment in combination with the sibling relationship than older siblings.

Not finding any significant effects of differential parental treatment for the mixed-sex sibling pairs indicates that when a sib in the family is favored it has little impact on the adjustment of an adolescent as long as the sib is of opposite sex. The explanation may be that an adolescent is more likely to compare its' situation with a same-sex sib than with a cross-sex sib, as is suggested by social comparison theory (Festinger, 1954; Feinberg *et al*., 2000).

Our study showed that after controlling for the absolute levels of maternal or paternal warmth, differential parental treatment was significantly related to adolescent delinquency, but only for a specific group of adolescents. It was found that feeling disfavored by parents was linked to vandalism and violence, only for younger boys in relation to mothers. These findings substantiated the results found by Feinberg and Hetherington (2001) but were in contrast with Tamrouti-Makkink *et al*. (2004).

Our study also showed that younger siblings in same-sex sibling pairs were vulnerable to differential parental treatment, but that older siblings were not. Importantly, this held when delinquency was predicted one year later. The longitudinal findings are of importance, because most studies on differential parental treatment have been cross-sectional and could not address causality. Only Conger and Conger (1994) revealed that differential maternal treatment was indicative for an increase in differences in sibling delinquency. Our study extends that finding, because we were able to show that in same-sex sibling pairs only the younger brothers seem to be affected by maternal differential parental treatment. It was shown that when younger siblings feel treated disfavorably by their mothers, they become relatively more vandalistic and violent one year later. These differences between younger and older siblings are in contrast to some studies that suggest that firstborns are more vulnerable to differential parental treatment (Tamrouti-Makkink *et al*., 2004) but corroborate the results from research that shows that later-borns are more vulnerable to differences in parenting (McHale *et al*., 1995). There are several reasons why older siblings may be less vulnerable to differential parental treatment. Older siblings have more advanced cognitive skills and responsibilities, which may make them more accepting of differences in parental treatment (Kowal and Kramer, 1997). Also, as adolescents grow older, the significance of friends relative to parents increases in terms of providing support, warmth, and companionship (Furman and Buhrmester, 1992). Consequently, feeling that a sibling obtains more warmth may be less threatening to earlier-born than to later-born. Finally, our findings support Feinberg *et al*.'s (2000) idea that older siblings may be inclined to downward comparison while the

younger adolescents may tend to upward comparison, which may make the latter more vulnerable to differential treatment.

As far as we know, there have been very few attempts to assess whether sibling relationships moderate the relation between differential parental treatment and delinquency. One major finding of our study was that the direct associations between differential parental treatment and delinquency were moderated by the quality of the sibling relationship. The interactions indicated that differential parental treatment seemed to matter most to younger siblings, who perceived their sibling relationship to be poor. Younger siblings who reported a negative sibling relationship and felt treated disfavorably showed the highest involvement in delinquency, but they showed substantially lower levels of involvement when they felt favored. These effects were gender specific. While boys displayed more vandalism and violence when they felt treated less favorably and had a poor sibling relationship, girls showed higher levels of involvement in theft. This finding suggests an additive family risk model, which assumes that higher levels of problematic behaviors will be expressed by children and adolescents who experience more family risk factors, in this case poor sibling relations and disfavored parental treatment (cf. Garcia *et al*., 2000). The fact that in case the sibling relationship was good, differential parental treatment seemed to be less important indicates that when younger siblings have a warm and supportive sibling relationship, their adjustment may not be impaired from being disfavored compared to their siblings. This implies that we may not be able to fully understand the significance of differential parental treatment for adolescent adjustment unless we take the sibling relationship into account. Furthermore, since not only the sibling relationship, but also the delinquency of the sibling may be related to adolescent delinquency, future research could include the sibling behavior as well.

Despite the strengths of the study, some caveats should be kept in mind while interpreting the results. First, self-reports have been used to assess the predictor and outcome variables, which may have run the risk for shared method variance. Second, only full families have been studied in this investigation. Although two-parent families are the predominant family constellation in western societies and thus the findings may apply for the majority of families, the study does not suggest that the findings can be generalized to all families, including single-parent families. It has been found that although single parents do not show higher levels of negativity, they tend to be more differential towards their children in the negativity that they do show (Jenkins *et al*., 2003). Third, we studied to what extent differential parental treatment predicts differences in delinquency, one year later. However, it is likely that bidirectional influences exist between differential parental treatment and adolescent behavior. Thus, adolescent behavior, but also intrapersonal characteristics such as temperament, may evoke negative reactions from parents, which may be expressed in differential treatment towards that child. This treatment in turn may contribute to later behavioral problems. Longitudinal research covering more than two or three waves is recommended to adequately address these reciprocal influences. Furthermore, other factors such as sibling delinquency, may be related.

The present investigation showed that within same-sex sibling pairs the quality of the sibling relationship may pose a risk additional to differential parental treatment. For younger siblings, a low quality sibling relationship coupled with feeling treated less favorably, especially by the mother, seems to be predictive for theft in girls and vandalism and to a lesser extent violence, in boys. Further research including a more diverse population of families, is encouraged to substantiate the present findings.

References

Acoca L (1999) Investing in girls: a 21st century strategy. Juvenile Justice 6:2–21

Adler A (1929) The science of living. Allen and Unwin, London

Aiken L, West S (1991) Multiple regression: Testing and interpreting interaction. Sage, Newbury Park, CA

Bank L, Patterson GR, Reid J (1996) Negative sibling interaction patterns as predictors of later adjustment problems in adolescent and young adults males. In: Brody GH (ed) Sibling relationships: Their causes and consequences. Ablex, New York, pp 197–229

Brody GH, Stoneman Z, Burke M (1987) Child temperaments, maternal differential behavior, and sibling relationships. Dev Psychol 23:354–262

Brody GH, Stoneman Z, McCoy JK (1992a) Parental differential treatment of siblings and siblings differences in negative emotionality. J Marriage Fam 54:643–651

Brody GH, Stoneman Z, McCoy JK (1992b) Associations of maternal and paternal direct and differential behavior with sibling relationships: Contemporaneous and longitudinal analyses. Child Dev 63:82–92

Conger K, Conger R (1994) Differential parenting and change in sibling differences in delinquency. J Fam Psychol 8:287–302

Crick NR, Dodge KA (1994) A review and reformulation of social information-processing mechanisms in children's social adjustment. Psychol Bull 115:74–101

Daniels D, Plomin R (1985) Differential experiences of siblings in the same family. Dev Psychol 21:747–760

Deutsch M (1985) Distributive justice: A social-psychological perspective. Yale University Press, New Haven, CT

Federal Bureau of Investigation (2001). Crime in the United States 2000. U.S. Government Printing Office, Washington, DC

Feinberg M, Hetherington EM (2001) Differential parenting as a within-family variable. J Fam Psychol 15:22–37

Feinberg ME, Neiderhiser JM, Simmens S, Reiss D, Hetherington EM (2000) Sibling comparison of differential parental treatment in adolescence: Gender, self-esteem, and emotionality as mediators of the parenting-adjustment association. Child Dev 71:1611–1628

Festinger L (1954) A theory of social comparison processes. Human Relat 7:117–140

Furman W, Buhrmester D (1985) Children's perceptions of the personal relationships in their social networks. Dev Psychol 21:1016–1024

Furman W, Buhrmester D (1992) Age and sex differences in perceptions of networks of personal relationships. Child Dev 63:103–115

Garcia MM, Shaw DS, Winslow EB, Yaggi KE (2000) Destructive sibling conflict and the development of conduct problems in young boys. Dev Psychol 36, 44–53.

Gray MR, Steinberg L (1999) Unpacking authoritative parenting: Reassessing a multidimensional construct. J Marriage Fam 61:574–587

Harakeh Z, Scholte R, de Vries H, Engels RCME (2005) Parental rules and communication: their association with adolescent smoking. Addiction 100:862–870

Jenkins JM, Rasbash JR, O'Connor TG (2003) The role of the shared family context in differential parenting. Dev Psychol 39:99–113

Kazdin AE (1996) Conduct disorders in childhood and adolescence. Sage Publications, Beverly Hills, CA

Kowal A, Kramer L (1997) Children's understanding of parental differential treatment. Child Dev. 68:113–126

Kowal A, Kramer L, Krull JL, Crick NR (2002) Children's perceptions of the fairness of parental preferential treatment and their socioemotional well-being. J Fam Psychol 16:297–306

McGuire S, Dunn J, Plomin R (1995) Maternal differential treatment of siblings and children's behavioral problems: A longitudinal study. Dev Psychopathol 7:515–528

McHale SM, Crouter AC, McGuire SA, Updegraff KA (1995) Congruence between mothers' and fathers' differential treatment of siblings: Links with family relations and children's well-being. Child Dev 66:116–128

McHale SM, Pawletko TM (1992) Differential treatment of siblings in two family contexts. Child Dev 66:116–128

McHale SM, Updegraff KA, Jackson-Newsom J, Tucker J, Crouter AC (2000) When does parents' differential treatment have negative implications for siblings? Soc Dev 9:149–172

Minuchin P (1985) Families and individual development: provocations from the field of family therapy. Child Dev 56:289–302

Minuchin P (1988) Relationships within the family: a systems perspective on development. In: Hinde RA, Stevenson-Hinde J (eds) Relationships within families: Mutual influences. Clarendon, Oxford, pp 7–26

Moffitt TE (1993) Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. Psychol Rev 100:674–701

Moffitt TE, Caspi A, Dickson N, Silva P, Stanton W (1996) Childhood-onset versus adolescent-onset antisocial conduct problems in males: Natural history from ages 3 to 18 years. Dev Psychopathol 8:399–424

Moffitt TE, Caspi A, Rutter M, Silva PA (2001) Sex differences in antisocial behavior: Conduct disorder, delinquency, and violence in the Dunedin longitudinal study. Cambridge University Press, Cambridge, UK

Neiderhiser JM, Reiss D, Hetherington EM, Plomin R (1999) Relationships between parenting and adolescent adjustment over time: Genetic and environmental contributions. Dev Psychol 35:680–692

Patterson GR (1984) Siblings: Fellow travellers in coercive family processes. In: Blanchard RJ (ed) Advances in the study of aggression. Academic Press, New York, pp 174–213

Patterson GR (1986) The contribution of siblings to training for fighting: A microanalysis. In: Olweus D, Block J, Radke-Yarrow M (eds) Development of antisocial and prosocial behavior: Research theories and issues. Academic Press, New York, pp 235–261

Plomin R, Asbury K, Dunn J (2001) Why are children in the same family so different? Non-shared environment a decade later. Can J Psychiatry 46:225–233

Plomin R, Daniels D (1987) Why are children in the same family so different from each other? Behav Brain Sci 10:1–16

Reiss D, Hetherington M, Plomin R, Howe GW, Simmens SJ, Henderson SH, O'Connor TJ, Bussell DA, Anderson ER, Law T (1995) Genetic questions for environmental studies: Differential parenting and psychopathology in adolescence. Arch Gen Psychiatry 52:925–936

Scaramella LV, Conger RD, Simons RL (1999) Parental protective influences and gender-specific increases in adolescent internalizing and externalizing problems. J Res Adolescence 9:111–141

Scholte RHJ, van Lieshout CFM, van Aken MAG (2001) Perceived relational support in adolescence: Dimensions, configurations, and adolescent adjustment. J Res Adolescence 11:71–94

Slomkowski C, Rende R, Conger KJ, Simons RL, Conger R (2001) Sisters, brothers and delinquency: Evaluating social influence during early and middle adolescence. Child Dev 72:271–283

Stocker CM, Burwell RA, Briggs ML (2002) Sibling conflict in middle childhood predicts children's adjustment in early adolescence. J Fam Psychol 16:50–57

Tamrouti-Makkink ID, Dubas JS, Gerris JRM, van Aken MAG (2004) The relation between the absolute level of parenting and differential parental treatment with adolescent siblings' adjustment. J Child Psychol Psychiatry 45:1397–1406

Tucker CJ, McHale SM, Crouter AC (2003) Dimensions of mothers' and fathers' differential treatment of siblings: Links with adolescents' sex-typed personal qualities. Fam Relat 52:82–89

Turkheimer E, Waldron M (2000) Nonshared environment: A theoretical, methodological and quantitative review. Psychol Bull 126:78–108

Van Der Vorst H, Engels RCME, Meeus W, Deković M, van Leeuwe J (2005) The role of alcohol-specific socialization on adolescents' drinking behaviour. Addiction 100:1464–1476

Zahn-Waxler C, Polanichka N (2004) All things interpersonal: Socialization and female aggression. In: Putallaz M, Bierman KL (eds) Aggression, antisocial behavior, and violence among girls: A developmental perspective. Guilford Press, New York, pp 48–68