

# Perceived support in sibling relationships and adolescent adjustment

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**Background:** Siblings may support each other, but also reveal fierce rivalry and mutual aggression. Supportive sibling relationships have been linked to the development of psychosocial competence of children. In the present longitudinal study, we will focus on the development of perceived support in sibling dyads and on the influence of sibling support and sibling problem behavior on psychosocial adjustment in adolescence. **Method:** In a three-wave longitudinal sample of 285 Dutch families with two adolescent children (11- to 15-year-olds), these two siblings judged the support perceived from each other. In addition, they themselves and their parents judged their internalizing and externalizing problem behaviors. The relation of sibling support and sibling problem behavior with internalizing and externalizing problem behaviors was examined while controlling for support from parents and friends and, over time, controlling for the autoregressive effects of problem behavior. **Results:** Support perceived from a sibling is mostly negatively related to externalizing problems; sibling problem behavior is strongly related to internalizing problems. Differential developmental trajectories of adolescents' adjustment are associated with siblings' support and problem behavior. **Conclusion:** The results indicate that adolescents' relationships with both older and younger siblings are characterized by modeling processes. **Keywords:** Siblings, support, adjustment.

Family relationships have long been recognized as important in children's development. Only recently have sibling relationships gained interest, although they are among the most enduring relational contexts and affect individual development throughout the life course (Brody, 1998; McHale, Updegraff, Helms-Erikson, & Crouter, 2001). About 80 to 90% of individuals are estimated to grow up with a sibling (Cicirelli, 1982), and although sibling relationships become less intensive during adolescence (Dunn, Slomkowski, Beardsall, & Rende, 1994), adolescents still spend about 13% of their time with their sibling (Csikszentmihalyi & Larson, 1984). Siblings have been found to be a source of support to each other (Furman & Buhrmester, 1985; Lempers & Clark-Lempers, 1992; Scholte, van Lieshout, & van Aken, 2001a). This study addresses the question how adolescents' perceived sibling support develops during adolescence and how sibling support and sibling problem behaviors relate to adolescent psychosocial adjustment.

## *Relationships with older and younger siblings*

Sibling relationships may be described using a conglomerate of demographic characteristics, such as birth order, gender constellation, and age discrepancies. These characteristics have been investigated many times and have been found only minimally to affect adolescent development directly (Schvaneveldt & Ihinger, 1979; Brody, 1998). That is, there is little evidence for effects of birth order on adolescents' personal characteristics and behavior. However,

these characteristics may affect processes involved in sibling relationships, and may also influence the specific meaning of these sibling relationship processes for individual development. Specifically, the relationship with an older sibling may have different consequences for adolescent development than the relationship with a younger sibling.

Different processes in sibling relationships have been identified that may explain the effect that siblings have on each other. Children may learn behavior possibilities by observing and interacting with their sibling, a process that has been described as sibling identification (Bank & Kahn, 1976). The position of the child within the family constellation of being the older or younger dyad member may affect identification processes in sibling relationships. For example, siblings higher in the birth order hierarchy have higher status and may therefore serve as role models for later-born children, with younger siblings more likely to model older siblings than the reverse (Brim, 1958). Adolescents tend to perceive older siblings as more domineering and nurturing than younger siblings, and later-born siblings also report greater admiration for and intimacy with older siblings than earlier-born siblings toward younger siblings (Furman & Buhrmester, 1992). Furman and Buhrmester suggested that these differences might reflect the process in which older siblings struggle for separation and individuation from the family while younger siblings identify with the greater autonomy of older siblings in trying to acquire the same status.

Children may also define their identity and their uniqueness in their family, a process that has been

described as differentiation or deidentification. Sibling deidentification has been proposed as a process whereby siblings try to distinguish themselves from their brothers and sisters and develop different qualities and interests in an effort to avoid direct competition for resources and establish their own role and identity within the family (e.g., Schachter, Shore, Feldman-Rotman, Marquis, & Campbell, 1976; Sulloway, 1996). Deidentification processes are hypothesized to be stronger when siblings are more similar (e.g., in age, sex). For example, Feinberg and Hetherington (2000) found deidentification to be more powerful when the age difference between adolescent siblings was smaller. Also, deidentification was found to be higher for same-sex than opposite-sex siblings among first- and second-born sibling pairs (Schachter, Gilutz, Shore, & Adler, 1978). Deidentification processes may become even stronger during adolescence, in order to acquire greater autonomy from the family and to achieve individual identity while at the same time maintaining a good sibling relationship (Feinberg, McHale, Crouter, & Cumsille, 2003). Sibling deidentification is more manifest in later adolescence and, therefore, may be more evident in the oldest adolescent in sibling dyads.

### *Support in sibling relationships*

Usually, siblings are important sources of support and companionship to each other, although the sibling relationship may at the same time be characterized by conflict and competition (Furman & Buhrmester, 1985). Tucker, McHale, and Crouter (2001) found that both older and younger siblings are viewed as sources of support in familial issues, and older siblings are in addition viewed as a source of support about nonfamilial issues such as social and scholastic activities.

Changes in various aspects of sibling relationships have been studied. Sibling relationships tend to become more egalitarian, less asymmetrical and less intensive from middle childhood to adolescence (Buhrmester & Furman, 1990; Furman & Buhrmester, 1992). Whereas older siblings have to relinquish some of their power, younger siblings have to acquire a more equal status. Intimacy in adolescent sibling relationships has been found to increase for both older and younger siblings, whereas control in sibling relationships tends to decrease (Updegraff, McHale, & Crouter, 2002). The only study addressing changes in sibling support during adolescence found perceived sibling support to be stable from age 12 to age 17 (Scholte et al., 2001a). We are not aware of studies comparing changes in perceived sibling support from older versus younger siblings. Our first goal was to assess changes in perceived sibling support across adolescence for younger and older siblings separately. We expect support from siblings to increase during adolescence.

### *Sibling relationship and adjustment*

Our second goal was to examine the differential influences of perceived support from older versus younger siblings on adolescents' internalizing and externalizing behaviors. Perceived support in general has been linked to adolescent adjustment, in that adolescents who perceive more support exhibit fewer internalizing and externalizing problem behaviors (e.g., Fuhrman & Holmbeck, 1995; Barrera, Chassin, & Rogosch, 1993). Effects of perceived support on adolescents' adjustment have nevertheless mainly been found for parental and friend support and need to be extended to sibling support. The sparse studies available suggest that sibling relationships can exert a positive as well as a negative influence on individual adjustment. For example, warmth shared between siblings has been found to be associated with positive self-worth (Stocker, 1994). Also, older siblings' delinquency predicts younger siblings' delinquent activity (Fagan & Najman, 2003) and collusive sibling processes have been described by which siblings form coalitions that promote deviance and undermine parenting (Bullock & Dishion, 2002).

Siblings seem to exert a unique, independent influence on each other during adolescence, even when parental and peer influences are controlled for. For example, siblings uniquely influenced adolescents' antisocial behavior (e.g., Slomkowski, Rende, Conger, Simons, & Conger, 2001). In a sample of adolescents, Moser and Jacob (2002) reported that although sibling relationships did not predict positive adolescent behavior after the effect of parenting was taken into account, sibling relationships were a significant predictor of deviant behavior, even after statistical control for parenting effects and earlier problem behaviors. Internalizing behavior in particular was predicted by conflict in sibling relationships. Furthermore, in youth with insulin-dependent diabetes mellitus, sibling relationships were found to assert an influence on the general psychosocial adaptations independent of family functioning (Hanson et al., 1992). Specifically, higher sibling conflict was related to lower self-esteem and higher externalizing behavior, whereas higher status/power was related to higher internalizing behavior. Even the quality of sibling relationships in the preschool period has been found to predict early adolescents' internalizing and externalizing behaviors, and these relations seemed stronger for older adolescents (Dunn et al., 1994). Older siblings' adjustment was mainly related to their own (unfriendly) behavior towards their sibling, whereas the adjustment of younger siblings was related to both their own and their siblings' behavior.

A possibility that has received little attention is that effects of the sibling relationship and sibling problem behavior on adolescent adjustment may differ for older siblings versus younger siblings. Evidence for both modeling and deidentification of

older and younger siblings has been reported in the domain of adolescent sex-typed friendship experiences (Updegraff, McHale, & Crouter, 2000). For adolescent gender orientation, younger adolescents were found to model their older siblings, becoming more similar, and older adolescents were found to deidentify from their younger siblings, becoming more different from their younger siblings (McHale et al., 2001). This influence of siblings on gender orientation was found to be stronger than parental influence, and parental influence was more commonly found for older siblings than for younger siblings. Older siblings have also been found to enhance younger siblings' empathy (e.g., Tucker, Updegraff, McHale & Crouter, 1999). Furthermore, control in adolescent sibling relationships has been found to be related to control in adolescent friendships for both older and younger siblings, but intimacy in adolescent sibling relationships was related to intimacy in adolescent friendships only for older siblings (Updegraff et al., 2002). These studies suggest that whereas younger adolescents are more likely to model and learn from their older sibling, older siblings are more likely to deidentify from their younger sibling.

It is as yet unclear how perceived support from younger versus older siblings and younger versus older siblings' problem behavior are differentially related to adolescents' internalizing and externalizing problem behaviors. The present study addresses the question of whether the relations of adolescents' perceived sibling support to adolescent psychosocial adjustment differ as a function of the birth order of the siblings in sibling dyads across the ages of 11 to 17 years. We expect that a warm and supportive relationship with an older sibling may foster adolescents' psychological adjustment more than such a relationship with a younger sibling. Older adolescents' support towards their younger sibling will reveal stronger associations with fewer behavioral problems of the younger sibling than vice versa. We expect these differences between support from older and younger siblings to sustain over time, controlling for initial levels of problem behavior. Also, we expect the effect of support from an older sibling to appear after controlling for support from family members and friends.

In addition, we will examine identification and differentiation processes directly by assessing the differential influences of older versus younger siblings' problem behaviors on adolescents' internalizing and externalizing behaviors. We expect older siblings' problem behavior to be positively related to younger adolescents' adjustment problems over time, revealing sibling identification processes. Younger siblings' problem behaviors are expected to have a negative relation to older adolescents' adjustment problems over time, demonstrating differentiation processes.

## Method

### Participants

Participants were from a nation-wide representative sample of Dutch middle-class two-parent families, participating in the Nijmegen Family and Personality Project, a three-wave longitudinal study with intervals of one year between subsequent waves. These families consisted of both parents and two of their biological children between 11 and 15 years of age, all living at the same address (Haselager & Van Aken, 1999). Families were selected from civil registry lists provided by 23 randomly selected municipalities across the Netherlands. The candidate families were contacted by phone and invited to participate, until the required number of participants was attained. For the total sample, families were selected in such a way that nearly equal numbers of adolescents were 11, 12, 13, 14, and 15 years of age at the first wave. In the end, 564 candidate families were approached, could be reached, and matched the sample requirements (especially related to the age of children), and 288 of these families (51%) agreed to participate. Some frequent reasons why candidate families did not participate were: the family was not interested in the theme of the project, one of the four family members did not want to cooperate, or the family said they never took part in research. The attrition rate was very low: of the 288 families that started the study, 285 families still participated in Wave 3.

The total sample included 158 families (54%) with 2 children, 77 families (28%) with 3 children, 33 families (11%) with 4 children, and 17 families with 5 or more children. In 224 families (79%) the older child who participated in the study was the oldest child in the family. In 219 families (77%) the younger child had only one older sibling. The older adolescents (142 boys, 143 girls) were 14.5 years of age on average (ranging from 11.4 to 16.0); the younger adolescents (135 boys, 150 girls) were 12.4 years of age on average (ranging from 11.0 to 14.8). On average, older and younger children differed by 2 years in age. Therefore, at the third wave, the younger children were on average the same age as the older children at the first wave. Sibling dyads occurred in all four possible gender constellations (67 boy-boy, 75 boy-girl, 68 girl-boy, and 75 girl-girl).

The average ages for the fathers ( $n = 285$ ) and mothers ( $n = 285$ ) were 43.9 and 41.7 years (ranging from 34.0 to 56.1 and 34.0 to 51.2 respectively). Ninety-six percent of the families were of Dutch origin. A small proportion of the parents, 17% of the mothers and 19% of the fathers, had finished primary or low secondary education. Forty-six percent of the fathers and 28% of the mothers had been enrolled in college or university education.

### Procedure

During home visits interviewers asked the mother, the father, and each of two target adolescents to simultaneously fill out some questionnaires on family relationships, personality and adjustment. The presence of the interviewer encouraged complete responses and prevented collaboration among the family members as they completed the questionnaire.

In each measurement wave, the two adolescent respondents in the family were rewarded with a CD voucher, worth €7, after they and all their family members had completed the questionnaires. Furthermore, following the completion of the third wave of measurement, ten lottery prizes consisting of a traveling voucher, worth €900, were distributed among families which had participated on all 3 occasions.

## Measures

**Perceived support.** Perceived sibling support was measured with the Relational Support Inventory (RSI; Scholte et al., 2001a). The inventory involves 24 questions representing four dimensions of perceived support measured by six items each along a 5-point Likert scale ranging from *very untrue of this person* (1) to *sometimes untrue, sometimes true of this person* (3) to *very true of this person* (5).

The first support dimension, perceived Quality of Information, assesses the quality of information and withholding of information. A sample item is: 'This person explains or shows how I can make or do something.' The second support dimension is perceived Respect for Autonomy and assesses respect for autonomy and limit setting. For example, 'This person lets me solve problems as much as possible on my own but also provides help when I ask for it.' The third support dimension is perceived Emotional Support and assesses warmth as opposed to hostility. A sample item is: 'In this person's view, I can't do anything right: he/she is always criticizing me.' The fourth support dimension is perceived Convergence of Goals and assesses the perceived level of convergence as opposed to divergence of goals. For example: 'This person and I have many conflicts with regard to my school achievement, future, or career opportunities' (reverse coded). Siblings judged the support they perceived from each other and from their father, mother and best friend. RSI total scores were averaged across all 24 items. Cronbach's alphas were .86 and .85 for support from older and from younger siblings. For younger siblings' judgments of fathers, mothers, and best friends, alphas were .80 each, whereas for older siblings' judgments, alphas were .87, .85, and .81, respectively.

**Problem behavior.** To assess problem behavior, the Nijmegen Problem Behavior List (NPBL) was used. This instrument was developed to measure internalizing and externalizing behavior. Items are formulated to represent problem behavior (withdrawn, anxious/depressed behavior for the internalizing scale, aggressive and delinquent behavior for the externalizing scale) in a non-clinical setting (De Bruyn, Vermulst, & Scholte, 2003; Scholte, Vermulst, & De Bruyn, 2001b). The NPBL contains 16 items on a 5-point scale and is validated as a self-report measure but also as an other-report measure. Internalizing and externalizing problem behavior of adolescents was assessed by self-ratings of the adolescents and by ratings of fathers and mothers. Ratings of fathers and mothers were averaged. Internalizing behavior is measured with 9 items (e.g., I withdraw from others, I feel sad, unhappy). Cronbach's alpha varies from .81 to .88 for the different

versions. Externalizing behavior is measured with 7 items (e.g., I readily threaten others with violence, I cheat others). Cronbach's alpha varies between .77 and .89.

## Statistical analyses

**Latent growth curve modeling (LGM)** was used to examine changes in perceived sibling support of older and younger siblings. LGM is a flexible technique that can be used to model longitudinal change in repeated measures of variables (Duncan, Duncan, & Strycker, 2001; Mehta & West, 2000; Raudenbush & Chan, 1993). The focus in latent growth curve analysis is on unobserved latent factors that are thought to represent the growth trajectories giving rise to the repeated measures over time, while controlling for the effects of measurement error.

Univariate latent growth models were fitted to the dyadic support perceptions of the older and the younger siblings to determine the form of the growth trajectory that most adequately described the characteristics of change trajectories in support perceptions. The cases with missing values were deleted listwise, resulting in an input sample of  $N = 271$ . In multigroup LGMs (LISREL 8.5; Jöreskog & Sörbom, 1998), we estimated changes in sibling support for different cohorts of younger and older siblings (11, 12, and  $\geq 13$  years for younger siblings and  $\leq 13$ , 14, and 15 years for older siblings). In the younger sibling group, 89 adolescents were initially from the 11-year cohort, 125 from the 12-year cohort, and 57 from the cohorts of 13 years and older. In the older sibling group, 69 adolescents initially were from the cohort of 13 years and younger, 106 from the 14-year cohort, and 96 from the 15-year cohort. Using the different cohorts as different groups in the LGMs enabled us to estimate changes in sibling support from 11 to 15 years of age for younger siblings and from 13 to 17 years of age for older siblings.

We specified a change trajectory by fitting a model with the slope factor loadings for age group 1 and 2 being 0 and 1, and the factor loading for the other three age groups freely estimated. Freely estimating the other parameters enabled us to model an unspecified trajectory where the shape of the trajectory is determined by the data.

## Results

### Sibling support

Latent growth curve analyses were used to analyze changes in perceived sibling support during adolescence. Univariate growth models for dyadic support perceptions were estimated for older and younger adolescents separately. Table 1 contains the parameter estimates and the fit indices for these models. The fit indices show that these models provided a good fit to the data. Figure 1 shows the growth trajectories for support perceived from older and younger siblings.

The significant mean estimates for the intercepts (Intercept M, Table 1) indicate that the initial mean

**Table 1** Univariate latent growth curve results for perceived sibling support

	Support from younger sibling	Support from older sibling
Slope loadings		
T1 (age 11/ 13)	0	0
T2 (age 12/ 14)	1	1
T3 (age 13/ 15)	0	1.4
T4 (age 14/ 16)	-.71	.95
T5 (age 15/ 17)	-2.11	1.02
Intercept M	3.89**	3.83**
Intercept $\sigma^2$	.17**	.16**
Slope M	-.01	.09**
Slope $\sigma^2$	.03	.08**
Fit indices		
X <sup>2</sup> (df)	29.53* (16)	26.70* (16)
RMSEA	.06	.08
CFI	.99	.98

\**p* < .05, \*\**p* < .01.

scores on perceived sibling support significantly differed from zero. The variance for the intercept factors (Intercept  $\sigma^2$ ) was significantly different from zero, which indicates that there were systematic individual differences in adolescents' initial (T1) support perceptions. The slope mean estimates for each of the dyadic support perceptions across the five age groups showed whether mean-level change in perceived sibling support occurred over time. The older adolescents did not show a mean increase or decline in perceived support from a younger sibling over time, as indicated by the nonsignificant Slope M (-.01) in Table 1. The perceived support of younger adolescents from their older siblings revealed significant changes from 11 to 15 years of age (Slope

*M* = .09). Perceived support was best described with a nonlinear trajectory in which support increased strongly from age 11 to age 12 with a smaller increase later on. This average increase in support from older siblings in early adolescence may represent an effect of having an older sibling, but may also represent an age effect, in that in early adolescence, sibling support in general (i.e., from older and younger siblings) tends to increase strongly. From age 13, support from older siblings decreased somewhat, but remained higher than support from younger siblings. We used *t*-tests to test whether the differences in support from older versus younger siblings were significant at age 13, 14, and 15. Results showed that only at age 13 was support from older siblings significantly higher than support from younger siblings (*t* = -2.01, *p* < .05). The slope factor variance was significantly different from zero (Slope  $\sigma^2$  = .08, *p* < .01) only for support perceived from older siblings. This means that there were systematic individual differences in younger adolescents in the rate of change in support perceived from older siblings.

*Sibling support and adjustment*

Our second aim concerned the relations of sibling support and sibling problem behaviors to adolescents' internalizing and externalizing problem behaviors. A series of multiple regression analyses was conducted to test the relations between adjustment problems and support perceived in the sibling relationship. The first set of regression analyses focused on the concurrent relations in Wave 1 between sibling support and externalizing and internalizing problems for older and younger siblings separately, while controlling for various demographic characteristics of the siblings. Predictor variables were entered in blocks in the following order: 1) Target sex (dummy coded, 0 = boy and 1 = girl), target age, and number of siblings in the family; 2) sibling sex, a dummy variable coded to identify same- or mixed-sex sibling dyads (0 = same sex, 1 = mixed sex), age difference, support from father, support from mother, and support from best friend; and 3) sibling problem behavior, sibling support, the interaction between sibling support and sibling sex, the interaction between sibling support and siblings' age difference, and the interaction between sibling support and sibling problem behavior. The second set of analyses focused on the predictive effects of sibling support on problem behavior over time in Wave 3, while controlling for the initial level of problem behavior in Wave 1. In addition to the predictors in the first set of analyses, previous behavior at Wave 1 was entered as a predictor in the first block. To test for the independent effects of sibling support separately from support of other significant persons in the adolescent's network, support from father, mother, and friend were included as predictors in the second



**Figure 1** Development of perceived support from older and younger siblings during adolescence

block. Interaction terms of siblings' gender constellation and age difference with perceived sibling support were entered in the regression analyses to examine whether associations varied by sex or age influences. Variables were centered (i.e., the mean was subtracted from each variable) before each interaction term was formed to reduce multicollinearity (Aiken & West, 1991). All regression analyses were performed on self-reported as well as parent-reported problem behavior.

*Concurrent relations between sibling support and adjustment.* The results for self-reported and parent-reported concurrent behavior are displayed in Tables 2 and 3, and show that adolescent sex was related to older adolescents' self-reported and parent-reported externalizing problem behavior and younger adolescents' self-reported externalizing behavior (Table 2), with older and younger boys reporting more externalizing behavior. Younger adolescents' concurrent self-reported internalizing behavior (Table 3) was also related to sex, ( $\beta = .13$ ), with younger girls reporting more internalizing behavior than younger boys. The sex of the sibling was related to younger adolescents' self-reported concurrent internalizing behavior and older adolescents' parent-reported concurrent internalizing and externalizing behavior (Tables 2 and 3), indicating that adolescents with sisters revealed more problem behavior than adolescents with brothers. Furthermore, younger adolescents with more siblings reported more concurrent

externalizing behavior than younger adolescents with fewer siblings (Table 2).

In addition to these effects of sex and number of siblings, perceived support from older and younger siblings is also related to concurrent externalizing and internalizing behavior: Adolescents who perceive more support from their older or younger sibling report less internalizing behavior, and adolescents who perceive more support from their younger sibling report less externalizing behavior. For younger adolescents' externalizing behavior, interactions appeared between same/mixed sex dyad and sibling support and between sibling support and sibling problem behavior. These two interaction effects were followed up in three steps. First, to follow up the interaction between same/mixed sex dyad and sibling support, regression analyses with the younger siblings' externalizing behavior as the dependent variable were conducted for girls' and boys' same-sex and mixed-sex sibling dyads separately. Results showed that in boys' mixed-sex dyads (i.e., younger boys with an older sister), but not in the other dyads, there was a significant interaction between older sisters' support and problem behavior. Second, to follow up the interaction between sibling problem behavior and sibling support, regression analyses with the younger siblings' externalizing behavior as the dependent variable were conducted for high and low problem behaviors of older siblings separately. Results showed that there was a significant interaction

**Table 2** Hierarchical regression analysis on the effect of perceived sibling support on self-reported and parent-reported externalizing problem behavior in Wave 1

Target adolescent	Externalizing problem behavior							
	Older adolescent				Younger adolescent			
	Self-report		Parent report		Self-report		Parent report	
Predictor	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$
Step 1								
Target sex	-.21	-.20**	-.11	-.15**	-.19	-.18**	-.03	-.04
Target age	-.07	-.12	.00	.00	-.05	-.07	-.01	-.02
Number of siblings	.01	.02	.00	-.02	.08	.19**	.02	.07
Step 2								
Sibling sex	-.01	-.01	.07	.10*	-.02	-.02	.00	.00
Same/mixed sex	-.02	-.02	-.04	-.05	.10	.10	.01	.02
Age difference	-.03	-.04	-.05	-.09	-.01	-.01	-.02	-.04
Step 3								
Father support	-.32	-.31**	-.25	-.34**	-.16	-.15	-.15	-.19
Mother support	-.17	-.15	-.01	-.02	-.23	-.20	.02	.02
Friend support	.01	.01	.06	.06	-.15	-.13	-.16	-.19**
Sibling problem behavior	.05	.05	.58	.56**	.09	.09	.56	.58**
Sibling support	-.22	-.21*	.13	.17*	-.06	-.06	.04	.06
Sibling support*sibling sex	.05	.07	-.09	-.17*	.13	.18*	.05	.09
Sibling support*age difference	.03	.06	.00	.01	-.01	-.01	.03	.09
Sibling support*sibling problem behavior	-.03	-.05	.01	.02	-.06	-.12*	.00	-.01
$\Delta R^2$ step 1	.06**		.05**		.11**		.03*	
$\Delta R^2$ step 2	.30**		.15**		.15**		.08**	
$\Delta R^2$ step 3	.02		.28**		.04*		.33**	

Notes:  $F_{\text{older sibling self-report}}(14, 250) = 10.91^{**}$ ;  $F_{\text{older sibling parent report}}(14, 250) = 16.52^{**}$ ;  $F_{\text{younger sibling self-report}}(14, 250) = 7.48^{**}$ ;  $F_{\text{younger sibling parent report}}(14, 250) = 13.64^{**}$ .  
\* $p < .05$ ; \*\* $p < .01$ .

**Table 3** Hierarchical regression analysis on the effect of perceived sibling support on self-reported and parent-reported internalizing problem behavior in Wave 1

Target adolescent	Internalizing problem behavior								
	Older adolescent				Younger adolescent				
	Self-report		Parent report		Self-report		Parent report		
Predictor	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	
<b>Step 1</b>									
Target sex	-.09	.07	-.08	-.08	.16	.13*	-.09	-.09	
Target age	-.04	-.06	.01	.01	.08	.10	.04	.06	
Number of siblings	-.01	-.02	.01	.01	.01	.03	.03	.07	
<b>Step 2</b>									
Sibling sex	.10	.08	.19	.18**	.15	.13*	.11	.11	
Same/mixed sex	.07	.06	-.04	-.03	-.08	-.06	-.04	-.04	
Age difference	.09	.11	.00	.00	-.03	-.03	-.01	-.01	
<b>Step 3</b>									
Father support	-.41	-.33**	-.16	-.15	-.07	-.06	-.12	-.11	
Mother support	.32	.23	.13	.11	.18	.13	.26	.23	
Friend support	-.28	-.17**	-.14	-.10	-.42	-.30**	-.22	-.19*	
Sibling problem behavior	.21	.21**	.51	.49**	.19	.19**	.49	.50**	
Sibling support	-.38	-.29**	-.08	-.07	-.37	-.32**	-.07	-.07	
Sibling support*sibling sex	.07	.08	-.04	-.06	.07	.09	.01	.01	
Sibling support*age difference	.00	.01	-.02	-.03	-.04	-.06	-.01	-.02	
Sibling support*sibling problem behavior	.01	.02	.00	-.01	.02	.03	.01	.03	
$\Delta R^2$ step 1	.01		.01		.01		.02		
$\Delta R^2$ step 2	.21**		.09**		.19**		.05		
$\Delta R^2$ step 3	.07**		.24**		.07**		.25**		

Notes:  $F_{\text{older sibling self-report}}(14, 250) = 7.15^{**}$ ;  $F_{\text{older sibling parent report}}(14, 250) = 9.30^{**}$ ;  $F_{\text{younger sibling self-report}}(14, 250) = 6.50^{**}$ ;  $F_{\text{younger sibling parent report}}(14, 250) = 7.86^{**}$ .  
 \* $p < .05$ ; \*\* $p < .01$ .

between sibling sex constellation and support from older siblings when these siblings had fewer problems but not when these siblings had more problems. Third, these two interactions were combined and further explored by conducting regression analyses on younger boys' externalizing behavior in their mixed-sex dyads for high and low sibling (older sisters) behavior problems separately, which revealed that older sisters' support was related to more externalizing behavior in younger boys with older sisters with low problem behavior ( $\beta = .32, p < .05$ ).

The only relation with sibling support for parent reports of adolescent problem behavior occurred for parent-reported externalizing problem behavior of older adolescents, with more sibling support being related to more externalizing behavior (Table 2,  $\beta = .17$ ). A follow-up of the significant interaction of sibling support with sibling sex constellation ( $\beta = -.17$ ) revealed that there was a significant interaction of sibling support and sibling problem behavior only for older adolescent boys in same-sex dyads, that is, older boys with a younger brother. Further examination of this interaction for older boys with a younger brother with high versus low problem behavior revealed more externalizing problems in older boys with a younger brother who also had much parent-reported problem behavior ( $\beta = .72, p < .01$ ).

Father support was also significantly related to older adolescents' self-reported and parent-reported

externalizing behavior and self-reported internalizing behavior, with adolescents perceiving more father support revealing fewer problems. For younger adolescents' parent-reported externalizing behavior, older adolescents' self-reported internalizing behavior, and younger adolescents' self-reported and parent-reported internalizing behavior, a significant relation with friend support appeared: more friend support was related to fewer problems.

Furthermore, some significant relations with sibling problem behavior appeared, for parent-reported externalizing behavior and for both self-reported and parent-reported internalizing behavior. For both siblings, more similarity between adolescent and sibling problem behavior may point to mutual modeling or identification effects.

*Longitudinal relations between sibling support and adjustment.* The results for self-reported and parent-reported behavior over time are displayed in Tables 4 and 5, and show that adolescent sex was related to older adolescents' self-reported and parent-reported externalizing problem behavior and younger adolescents' self-reported externalizing behavior (Table 4), with older and younger boys reporting more externalizing behavior. Furthermore, parents of adolescents with more siblings reported more externalizing behavior over time (Table 4). For younger adolescents, age was positively related to self-reported internalizing behavior over time, and

**Table 4** Hierarchical regression analysis on the effect of perceived sibling support on self-reported and parent-reported externalizing problem behavior in Wave 3

Target adolescent	Externalizing problem behavior								
	Older adolescent				Younger adolescent				
	Self-report		Parent report		Self-report		Parent report		
Predictor	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	
Step 1									
Problem behavior Wave 1	.40	.35**	.55	.54**	.50	.47**	.49	.49**	
Target sex	-.27	-.23**	-.08	-.10*	-.17	-.15**	.02	.03	
Target age	-.05	-.07	-.01	-.02	.06	.09	.01	.02	
Number of siblings	.05	.09	.05	.14**	-.01	-.02	.03	.11*	
Step 2									
Sibling sex	-.04	-.04	.04	.05	-.01	-.01	-.01	-.01	
Same/mixed sex	.04	.04	.02	.02	-.05	-.04	.04	.06	
Age difference	-.01	-.01	-.02	-.05	-.04	-.06	-.01	-.02	
Step 3									
Father support	-.16	-.14	-.15	-.19	-.17	-.15	.00	.00	
Mother support	-.05	-.04	.09	.10	.08	.06	-.12	-.15	
Friend support	.06	.04	.03	.03	-.06	-.04	.05	.05	
Sibling problem behavior	-.08	-.07	.08	.08	.02	.02	.18	.19**	
Sibling support	-.05	-.04	.01	.01	-.15	.14	.09	.13	
Sibling support*sibling sex	.02	.03	-.01	-.02	-.18	-.23**	-.05	-.11	
Sibling support*age difference	.06	.09	.03	.07	.02	.03	-.01	-.03	
Sibling support*sibling problem behavior	.01	.02	-.02	-.05	-.01	-.01	-.03	-.10*	
$\Delta R^2$ step 1	.29**		.46**		.32**		.41**		
$\Delta R^2$ step 2	.02		.01		.02		.02		
$\Delta R^2$ step 3	.01		.01		.03		.03**		

Notes:  $F_{\text{older sibling self-report}}(15, 249) = 7.72^{**}$ ;  $F_{\text{older sibling parent report}}(15, 249) = 15.70^{**}$ ;  $F_{\text{younger sibling self-report}}(15, 249) = 9.51^{**}$ ;  $F_{\text{younger sibling parent report}}(15, 249) = 14.34^{**}$ .  
\* $p < .05$ ; \*\* $p < .01$ .

for older adolescents, sibling age difference was negatively related to parent-reported internalizing behavior (Table 5).

Over time, the only significant effect involving sibling support was the interaction of perceived sibling support with sibling sex constellation for younger adolescents' externalizing problem behavior (Table 4). A follow-up of this interaction revealed that more sibling support was related to lower self-reported externalizing behavior in younger adolescents two years later, even when controlling for initial externalizing behavior, but only in girls' mixed-sex dyads (i.e., younger girls with older brothers,  $\beta = -.43$ ,  $p < .05$ ). Despite the cross-sectional relations between sibling support and parent-reported problem behavior of the adolescents, found earlier, sibling support did not predict any change in parent-reported problem behavior.

For parent-reported externalizing behavior of younger adolescents and parent-reported internalizing behavior of both older and younger adolescents, significant relations with sibling problem behavior appeared. These relations again revealed that more sibling problem behavior was related to more adolescent problem behavior two years later, even after controlling for initial problem behavior, and may be interpreted as modeling or identification effects. The interaction between sibling problem behavior and sibling support for

parent-reported externalizing behavior of younger adolescents was significant as well. To follow up this interaction, regression analyses with the younger adolescents' externalizing behavior as the dependent variable were conducted for groups with high and low support from older siblings separately. Results showed that for younger adolescents with low sibling support, there was a stronger relation between parent-reported externalizing behavior and siblings' problem behavior than for younger adolescents with high sibling support ( $\beta = .30$ ,  $p < .01$  for low support versus  $\beta = .12$ ,  $p > .05$  for high support).

## Discussion

The goal of the present study was to elucidate to what extent siblings affect each other's development and psychosocial adjustment during adolescence. We tested the hypothesis that the support perceived from older siblings is more important for adolescents' development than the support perceived from younger siblings. Furthermore, we examined whether sibling support has additional effects on adolescents' adjustment after controlling for parental and friend support. Also, we examined the direct effects of sibling problem behavior on adolescent problem behavior to illuminate processes of identification and differentiation. Our study reveals a clear



increase in sibling support between the ages of 11 and 13 year for support perceived by younger adolescents from their older siblings, despite the substantial variation in individual developmental pathways in early adolescence. From 13 years onwards, younger adolescents' support perceived from older siblings stabilizes. Over the age range of 13 to 17 years, support perceived by older adolescents from their younger siblings was stable as well. These findings are in agreement with the stability of perceived sibling support over the same age range found by Scholte et al. (2001a). The established increase in perceived support may reveal a difference in perceived support between younger versus older siblings, but a simple age effect of increasing perceived support in early adolescence of younger as well as older siblings is not excluded. To exclude such an age effect as an explanation for our findings, we should have studied older adolescents at 11 and 12 years of age as well. However, the significantly higher support at age 13 perceived by younger from older siblings as compared to older from younger siblings suggests that age differences cannot completely explain the differences in the development of perceived support from younger versus older siblings.

A higher initial level of sibling support was related to lower initial levels of internalizing problem behaviors for both older and younger adolescents and for externalizing behavior of older adolescents, even after controlling for support from father, mother, and friend. These relations between sibling support and problem behavior were found for self-reported problem behavior and are in line with earlier findings (Moser & Jacob, 2002). Moreover, we also found that for a particular group of adolescents, support perceived from some siblings has a relation to problem behavior over time. Specifically, the results indicated that the support perceived by adolescent girls from an older brother but not from an older sister is related to their externalizing behaviors over time after controlling for parental and friend support. Even after taking into account initial predispositions towards externalizing behaviors, we find that over a two-year interval, adolescent girls reveal fewer externalizing behaviors when they perceive more support from an older brother. The support perceived from other siblings does not seem to have this effect. All in all, even though sibling relationships may seem less close and intense during adolescence compared to preschool and middle childhood, the results of this study yielded evidence for the importance of supportive sibling relationships for psychosocial adjustment in adolescence.

Contrary to our expectation, our study illustrates that support from older siblings is not more strongly related to psychosocial adjustment than support from younger siblings. This lack of differences suggests that older adolescents do not seem to handle psychosocial adjustment tasks as they handle tasks

of acquiring autonomy, independence, and intimate relationships with peers and close friends outside the family by trying to be as unique as possible and not let themselves be influenced by their younger siblings (Cooper, 1994; Grotevant & Cooper, 1986; Lapsley, 1993). Younger adolescents may have observed their older siblings' psychosocial adjustment and see them as an emulative example. But older adolescents seem to do the same. Therefore, they may actively seek their siblings' support and advice in this area and be open to the influence and help of their siblings. In this way, in the acquisition and maintenance of psychosocial adjustment the support perceived from an older sibling will not be more likely to affect a younger sibling than the other way around.

In addition to the lack of differences in older versus younger siblings' support, direct evidence for identification or modeling effects was also found for both older and younger siblings. For self-reported and parent-reported internalizing behavior and for parent-reported externalizing behavior, sibling problem behavior was positively related to adolescent adjustment problems. Adolescents, particularly boys, whose brother displayed more problem behaviors displayed more adjustment problems themselves. The longitudinal relations of sibling problem behavior with adolescents' parent-reported internalizing behavior remained significant, as well as the longitudinal relation with younger adolescents' parent-reported externalizing behavior, although the latter was found only for younger adolescents with low sibling support. These findings confirm our expectation that younger adolescents are likely to model their older sibling's behavior (Fagan & Najman, 2003). However, although we had expected differentiation processes for older adolescents, the results pointed to identification processes for older adolescents as well. Perhaps sibling relationships in adolescence can be regarded as friendship relationships in which both partners can learn from and adopt each other's behavior. The processes found in the current study may resemble collusive sibling processes by which siblings form coalitions that promote deviance (Bullock & Dishion, 2002), but that may also promote adaptive behavior in well-functioning families. In sum, adolescents are equally influenced by the support from younger and older siblings and the behavior of younger and older siblings, suggesting modeling or identification processes for both older and younger adolescents.

Sometimes sibling support was found to be related to more problem behavior: for boys with younger brothers revealing high problem behavior, more sibling support was related to more parent-reported externalizing problems, suggesting a modeling effect. Sibling support seems to encourage the modeling of 'bad' sibling behavior for these boys. For boys with older sisters revealing low problem behavior, more sibling support was related to more self-reported

**Table 5** Hierarchical regression analysis on the effect of perceived sibling support on self-reported and parent-reported internalizing problem behavior in Wave 3

Target adolescent	Internalizing problem behavior								
	Older adolescent				Younger adolescent				
	Self-report		Parent report		Self-report		Parent report		
Predictor	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	
Step 1									
Problem behavior Wave 1	.54	.49**	.60	.62**	.49	.47**	.69	.68**	
Target sex	-.02	-.01	-.02	-.02	-.02	-.02	.00	-.00	
Target age	.02	.02	.05	.08	.13	.16**	.04	.05	
Number of siblings	-.03	-.05	-.02	-.05	-.01	-.02	-.01	-.02	
Step 2									
Sibling sex	.08	.06	.05	.05	.00	.00	.00	.00	
Same/mixed sex	-.02	-.02	.00	.00	-.04	-.03	.01	.01	
Age difference	-.01	-.01	-.08	-.12*	.04	.05	-.03	-.04	
Step 3									
Father support	-.05	-.04	-.09	-.09	-.18	-.13	-.23	-.21	
Mother support	-.05	-.03	.08	.07	.09	.06	.07	.06	
Friend support	-.01	-.01	-.09	-.07	.06	.04	.06	.05	
Sibling problem behavior	.09	.08	.12	.12*	.04	.05	.13	.13**	
Sibling support	-.10	-.07	.12	.12	-.10	-.08	.11	.11	
Sibling support*sibling sex	.02	.02	-.07	-.09	-.07	-.08	-.05	-.07	
Sibling support*age difference	.06	.08	-.01	-.02	.00	-.01	-.02	-.03	
Sibling support*sibling problem behavior	.00	.00	.00	-.00	.04	.07	.00	-.00	
$\Delta R^2$ step 1	.33**		.50**		.32**		.56**		
$\Delta R^2$ step 2	.01		.02		.03		.02		
$\Delta R^2$ step 3	.02		.01**		.02		.01		

Notes:  $F_{\text{older sibling self-report}}(15, 249) = 9.02^{**}$ ;  $F_{\text{older sibling parent report}}(15, 249) = 18.54^{**}$ ;  $F_{\text{younger sibling self-report}}(15, 249) = 9.24^{**}$ ;  $F_{\text{younger sibling parent report}}(15, 249) = 23.87^{**}$ .  
\* $p < .05$ ; \*\* $p < .01$ .

externalizing problems, which suggests a differentiation effect. Perhaps boys with well-adjusted supportive older sisters have difficulties living up to this example and try to distinguish themselves from their sister by norm-breaking behavior. These findings need to be replicated in future research.

Apart from these few curious and unexpected interactional findings, the effects of sibling support and behavior on adolescent adjustment did not seem to differ greatly according to the gender constellation of the sibling dyad. In earlier research, relationships with same-sex siblings (in particular, sister dyads) are found to be closer than cross-sex sibling relationships (Buhrmester & Furman, 1990). However, these gender differences do not necessarily have to influence the effect of the sibling on adolescent adjustment.

Although many hypotheses of the study were confirmed, we did not find effects of older sibling support on younger adolescents' internalizing behaviors over time after controlling for support from parents and best friend. Our results seem to suggest that externalizing behaviors are more affected by supportive relationships with siblings than internalizing behaviors are. In contrast, internalizing behaviors seem more affected by siblings' internalizing behavior, in particular in the view of parents. A possible explanation for this finding is that whereas externalizing behavior is more likely to be elicited by interactions with family members and friends, internalizing be-

havior is more likely to be modeled after other family members such as siblings. This reminds us again that sibling influence may be domain specific and reaffirms the importance of examining effects of sibling support and sibling behavior separately for different aspects of adolescent behavior.

Among the strengths of this study were the use of latent growth curve modeling to assess the development of perceived sibling support during adolescence and the use of hierarchical regression models to examine relations between sibling support and problem behavior. The use of latent growth curve modeling enabled us to study the underlying development in support while controlling for measurement errors. The use of hierarchical regression analyses enabled us to assess the effects over time of sibling support and sibling behavior on adolescent problem behavior while controlling for initial problem behavior, as well as for support from other significant people in the adolescent's network. In addition, we used multiple ratings of problem behavior. These features give us greater confidence in the importance of sibling support and sibling behavior for adolescent psychosocial adjustment.

Despite these strengths, the study is limited by its focus on self-reported perceived sibling support instead of actual supportive behaviors. However, support perceptions have been found to be psychologically important variables that affect development

and psychological adjustment (e.g., Barrera, 1986). It is not so much the actual received support that seems to be important for well-being, but the perception that significant others will be there when needed. Also, the one longitudinal relation between sibling support and problem behavior was found only for adolescents' self-reports, and could not be replicated for parent reports, and the longitudinal relations for sibling behavior were found predominantly for parents' reports. Although these results could partly reflect rater effects, adolescents' self-reports on their problem behavior are found to be more valid than parent reports (Moretti, Fine, Haley, & Marriage, 1985). Adolescent-parent agreement on youth problem behavior is generally modest (e.g., Gadow et al., 2002; Hope et al., 1999), and adolescents tend to report higher levels of problem behavior than parents (Brown, 1999; Sourander, Helstelae, & Helenius, 1999), suggesting that their problem behaviors are likely to remain unnoticed by adults. Therefore, adolescents are indispensable informants of their own behavior (Verhulst & Van der Ende, 1992). An additional limitation concerns the generalizability of the results of the current study, which is limited to sibling relationships of adolescents from intact two-parent families. Future research might address a wider range of sibling relationships, such as siblings from a broader age range, siblings from a more ethnically diverse sample, and siblings from divorced or stepfamilies, to clarify whether the present findings generalize beyond the sibling relationships included in the study. However, our results clearly show that in the period of adolescence, siblings can be an important source of support.

To conclude, perhaps the most important lesson to be learned from this study is that sibling relationships and their consequences are not uniform and may vary across adjustment outcomes. Siblings can be an important source of support for each other during adolescence, and thereby affect both each other's externalizing behavior as well as each other's internalizing behavior. In the process of gaining autonomy and defining their identity, adolescents may seek help from their siblings, and thereby become an important role model for each other.

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