

## Longitudinal Linkages Between Sibling Conflict and Relationship Quality in Youth

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## Abstract

**Introduction.** This study aims explore the association between sibling conflict and relationship quality during early to middle adolescence longitudinally. Our second aim was to investigate a possible moderation effect of gender constellation.

**Method.** For this study, data from the RADAR project was used, which included 426 Dutch target adolescents from 13 till 15 years of age. A cross-lagged panel model was used to study the linkages between both constructs.

**Results.** We found that sibling conflict and relationship quality showed stability over time. Conflict and relationship quality were found to be related within waves. However, no cross-lagged effects were found, indicating that changes in conflict or relationship quality at one point in time did not predict changes in one another later on.

**Conclusion.** In contrary to previous research, no cross-lagged or moderation effects were found. We encourage future research to extent this study by enhancing the operationalization and measurements.

*Keywords:* Siblings, adolescence, conflict, relationship quality, negative interaction, support, gender constellation, longitudinal linkages

### Trajectory of the Association Between Sibling Conflict and Relationship Quality in Youth

Sibling relationships remain among the most important and the most lasting relationships across adulthood and into old age (Hernandez, 1997; McHale, Updegraff, & Whiteman, 2013; Nuckolls, 1993; Whiteman & Christiansen, 2008). Although often described as relationships characterized by warmth and support, sibling relationships also provide a framework for intense conflict (Dunn, 2007; Kennedy & Kramer, 2008). These conflict behaviours could play an important role in the development of the sibling relationship, specifically regarding relationship quality. Insights on the impact of sibling conflict can be of great importance, as they can provide clinicians with more in-depth understanding of dyads within the family. However, up to now, sibling conflict has rarely been studied in association to sibling relationship quality. In addition, the little research available regarding this association could not investigate the direction due to their cross-sectional nature. Therefore, this study will aim to extend previous literature on the association between sibling conflict and sibling relationship quality by using a longitudinal design.

#### **Social Learning Perspective and the Nature of the Sibling Relationship**

Out of several theoretical frameworks providing insights on the sibling relationships of youth, the social learning perspective has most frequently been used. This theory states that individuals acquire various social behaviours through two main mechanisms, namely observation and reinforcement (Bandura, 1977). Observational learning occurs when siblings observe and imitate each other and thereby acquire new knowledge. This knowledge does not necessarily have to be positive: They could imitate negative interactions such as conflict and hostility. Furthermore, observational learning suggests that models who are warm, nurturant and possess similar characteristics are most likely to be imitated (Bandura, 1977; McHale, 2013). Hence, siblings are likely to be seen as models, which implies that interactional styles of siblings are important sources of learning.

Besides observational learning, reinforcement of negative behaviour could contribute to development of negativity and aggression within the sibling relationship (Patterson, 1984). This process is referred as the 'coercive cycle'. For example, during episodes of conflict, siblings have learned that increasing their level of hostility is an effective way to make the other sibling comply. In this way, the negativity of the acting sibling as well as the complying behaviour is positively reinforced during this interaction. Hence, mechanisms of social learning provide a valuable framework on how sibling conflict can develop through processes of observation and imitation, and how conflict is maintained through coercive processes.

Conflict between siblings can also be explained by unique characteristics of this relationships. That is, certain features of this relationship allow adolescents to act upon their tempers. Specifically, interactions between siblings often take place without supervision of adults and the relationship is involuntary (McHale et al., 2013). Therefore, the nature of the sibling relationship creates a certain susceptibility for negativity. Nevertheless, Furman and Buhrmester (1985) argue that the sibling relationship can withstand a certain amount of negativity. This is because the siblings' childhood experiences contain a long history of interactions and the relationship is based on kinship. Moreover, due to their extensive interactions, siblings are being challenged to show social abilities which they are not compelled to do in other social contexts. These extensive interactions can be explained by their shared understanding of norms defined by their family and their emotional connectedness. Therefore, the sibling relationship provides the opportunity to develop social competencies and positive interactions (Howe & Recchia, 2005). Hence, on the one hand it can be argued that the unique characteristics of the sibling dyad facilitate negative interactions, on the other hand they create circumstances for developing positive social skills.

This latter, positive perspective is consistent with the social learning perspective, as different studies have shown that siblings can learn social skills in the context of their interactions, including conflict resolution and perspective-taking (Karos, Howe, & Aquan-Assee, 2007; Kennedy & Kramer, 2008; Killoren, Thayer, & Updegraff, 2008). For example, elevated levels of intimacy and decreased levels of negativity within the sibling relationship occurred when siblings frequently used adequate solution strategies to resolve their conflicts (Killoren, Thayer & Updegraff, 2008). Thus, the sibling relationship can be seen as a sufficient environment for practice with conflictual and negative interactions. This suggests a certain resilience of the sibling relationship regarding conflict, suggesting that conflict would not necessarily result in negativity in the sibling relationship. Hence, conflict in the sibling relationship might be beneficial to the sibling relationship by stimulating the development of social skills.

### **Sibling Relationship Quality and Conflict**

Several aspects play an important role in the perceived quality of the relationship between siblings, including warmth, closeness and support (Richmond, Stocker, & Rienks, 2010). According to the Network Relationships Inventory developed by Buhrmester and Furman (2008), warmth and closeness consist of several underlying concepts such as companionship, disclosure and emotional support. Research indicated that towards the end of adolescence, levels of intimacy and closeness between siblings increase (Kim, McHale,

Osgood, & Crouter, 2006). On the other hand, Buhrmester and Furman (1990) argued that perceived sibling warmth and closeness significantly declined over time. So, research seems inconclusive about the trajectory of warmth and closeness within the sibling relationship throughout adolescence.

Another commonly occurring feature of the sibling relationship includes conflict, which is often characterized by some degree of physical or verbal aggression (Buhrmester & Furman, 2006; McHale et al., 2013). Conflict within the sibling relationship has been found to decrease with age. For example, Buhrmester and Furman (1990) reported less fighting, antagonism and competitive behaviours with older siblings among twelfth graders in comparison to third graders. These findings fall within a broader trend; as children grow older, their sibling relationships become less intense over several domains such as power, warmth/closeness and conflict (Campion-Barr & Smetana, 2010). This trend could be expected, first of all because of the decreasing levels of overall interactions among siblings as they grow older (McHale et al., 2013). Second, an increase in social-cognitive skills such as perspective-taking and empathy increases social competence over time (Blakemore & Choudhury, 2006; Piaget, 1977). However, it should be noted that conflict appears to be uncorrelated with warmth/closeness, indicating many children might have ambivalent feelings about their siblings (Buhrmester & Furman, 2008). Therefore, conflict and warmth should not be regarded as bipolar constructs within the sibling relationship.

Although conflict, warmth and intimacy in the sibling relationship have been studied extensively, little research has examined the association between conflict and relationship quality between siblings. One of the few studies investigating this association, differentiated sibling conflict into either personal domain conflicts or moral conflicts regarding equality and fairness (Campion-Barr & Smetana, 2010). The results indicated that, for all age cohorts, more frequent and more intense conflicts regarding the dimension of personal domains were associated with poorer relationship quality. This association was not found with regard to moral conflicts. Nevertheless, the authors argue that both domains reflect the same tendency to claim issues to personal jurisdiction, even though these issues might be out of the other sibling's control. The underlying mechanisms that might account for the reported decrease of relationship quality could not be clarified, because of the cross-sectional nature of this study. On the one hand, it might be that elevated levels of conflict obstruct the development of a close relationship, on the other hand it could be argued that adolescents in a distal relationship experience conflict more frequently. Hence, by using a cross-sectional design, the direction of this association remains unclear.

Lindell, Campione-Barr and Basett-Greer (2014) used a longitudinal design to investigate the association between conflict in sibling pairs during the firstborn's transition to college. Generally, it was found that higher levels of sibling conflict were significantly related to reduced sibling negativity one year later. This is consistent with the previously mentioned framework, suggesting that the sibling relationship can be seen as an environment suited for practice in conflict management (e.g. Kennedy & Kramer, 2008). Although Lindell et al. (2014) suggest a negative association between sibling conflict and relationship quality, it remains important to note that this research was conducted specifically in the transition to college of one sibling. Due to this specific target population, these results cannot easily be generalized. This study aims to explore this association within a sample of siblings living together.

### **The Role of Gender**

Studies focussing on the role of gender within sibling relationships, have generally indicated that same-sex siblings feel more close and show higher levels of positivity in comparison to mixed-sex siblings (Buhrmester, 1992; Furman & Buhrmester, 1985; Kim, McHale, Crouter & Osgood, 2007; McHale et al., 2013). Specifically, it was found that sister pairs experience higher levels of intimacy between siblings than brother pairs (Kim et al., 2006; McHale et al., 2013). This could be explained by a general tendency for boy-boy interactions to be focused on individualistic enhancement, therefore facilitating competition and conflict (Buhrmester, 1992). Girl-girl interactions appear to be focused on strengthening relationships, therefore stimulating warmth and intimacy. Regarding mixed gender combinations, it was found that mixed-sex pairs display lower levels of intimacy in comparison to pairs of sisters (Kim et al., 2006; McHale et al., 2013). This could be expected from a social learning perspective, as same-sex siblings have a higher likelihood to be seen as a models because of their similarity, which could strengthen the process of observational learning (Bandura, 1977). Hence, the process of modelling seems to vary with gender composition (Bandura, 1977; McHale et al., 2013).

Furthermore, for mixed-sex siblings it was found that during middle childhood to early adolescence (about 9-11 years) levels of intimacy declined (Kim et al., 2006). Yet, in middle adolescence (15-17 years), these mixed-sex pairs experience an increase in intimacy. This could be explained by the emerging interest in the other sex, after a period of gender segregation during middle childhood. This emerging involvement with the other sex might stimulate mixed-sex sibling pairs to turn to each other for support, advice and companionship (Kim et al., 2006). The advising role of the other-sex sibling could therefore stimulate a more intimate and warm sibling relationship. Hence, it appears to be that same-

sex siblings report higher levels of positivity and warmth than mixed-sex pairs, yet mixed-sex pairs do display an increase during middle adolescence.

Regarding conflict within the sibling relationship, gender appears to be of importance as well. For example, college-age siblings in mixed-sex dyads were found to be less conflictual than same-sex pairs (Kim et al., 2006; Stocker, Lanther, & Furman, 1997). This finding is supported by the study of Stewart (1983), which stated that siblings from mixed gender dyads were more likely to serve as sources of comfort in contrast to same gender dyads. Siblings within same-sex constellations may be more sensitive to competition and issues of rivalry, which set way for conflictual interaction.

In summary, literature has established the important role of gender within sibling relations, regarding conflict as well as warmth and support (e.g. Kim et al., 2007; McHale, 2013). Accordingly, gender would be expected to play a role in the association between sibling relationship quality and conflict. Since, to our knowledge, no research has yet investigated this, our study will aim to describe the possible effects of gender within the association between sibling conflict and relationship quality.

### **The Current Study**

Although sibling relationship quality as well as sibling conflict has been studied extensively, little empirical research has studied the specific association between these constructs. Therefore, this study aims to extent previous literature by exploring the association between sibling conflict and relationship quality during early to middle adolescence. Correlational research of Campione-Barr and Smetana (2010) reported a negative association between sibling conflict and relationship quality. On the contrary, longitudinal data indicated that higher levels of sibling conflict were significantly related to reduced sibling negativity one year later (Lindell et al., 2014). These opposing results can either be explained through the unique characteristics of the sibling relationship or the social learning perspective (Bandura, 1977; McHale et al., 2013). Based on variability in empirical as well as conceptual literature, our hypothesis regarding the direction of this association will be explorative.

Furthermore, research has established the importance of gender constellation in sibling conflict as well as warmth and support (Buhrmester, 1992; Furman & Buhrmester, 1985; McHale et al., 2013; Kim et al., 2006). However, the effects of gender combinations on the association between conflict and relationship quality has not been studied so far. Therefore, the second aim of this study is to investigate a moderation effect of gender combination within this association. Previous literature reported that, although mixed-sex pairs experience elevated levels of intimacy in middle adolescence in comparison to early

adolescence, mixed-sex pairs display higher overall levels of warmth and positivity in their relationship (e.g. Buhrmester 1990; Stewart, 1983). So, mixed-sex sibling pairs might be more strongly affected by occurring conflict in comparison to same-sex dyads. Therefore, we expect that increased levels of conflict between mixed-sex siblings will be related to decreased levels of relationship quality. With respect to same-sex combination, we expect a stronger negative effect of conflict on relationship quality for pairs of brothers in comparison to pairs of sisters (Kim et al., 2006).

## Method

### Participants

This study used the data from the longitudinal project Research on Adolescent Development and Relationships Young Cohort (RADAR) investigating Dutch adolescents, their parents and their best friends. These participants were recruited from randomly selected high schools in the western and central region of the Netherlands. The first wave started in 2006, when adolescents were in their first year of high school. Data was collected annually, with Wave 3 being two years after the start of the first wave. This study used adolescents' reports of their relationship and interaction with one sibling from Wave 1 to Wave 3 of the RADAR project.

The initial sample of our study included 426 Dutch target adolescents ( $M = 13.03$ ,  $SD = .46$ , 56,1% males), 92,3% of those percent continued to participate in Wave 3. The average age difference between the adolescent and the sibling was 1.71 year, as sibling age was  $M = 14.74$  with  $SD = 3.11$ . The majority of adolescents' SES was classified as high or medium (89.2 %).

Based on listwise deletion, 40 cases were eliminated because they showed no input on any of the variables regarding characteristics of the sibling relationship. Outliers were detected using both univariate and multivariate analyses. Visual inspection of boxplots resulted in deletion of three invalid cases due to extreme scores. Furthermore, nine outliers were identified using Mahalanobis Distance ( $\chi^2 < .001$ ). The scatter plot of the Cook's Distance scores (with ID) revealed three outliers. Therefore, the analytic sample of our study included 444 participants. Regarding the analyses of gender constellation, missingness or inconsistent values for gender of siblings for all waves resulted in exclusion of 66 participants. For these analyses 378 participants were included (103 sister-sister pairs, 113 brother-brother pairs and 206 mixed-sex pairs).

### Procedure

At the start of the first wave, adolescents as well as their parents provided active written informed consent to participate in the RADAR project. During home visits from



research assistants, adolescents individually completed several questionnaires. The research assistant ensured that the battery of questionnaires was filled out independently and provided additional verbal instructions if needed. During each annual visit, the adolescent filled out the same questionnaires regarding sibling conflict and relationship quality.

Compensation was 25 euros for each participant per wave.

### Measures

To measure both sibling conflict and sibling relationship quality, The Network of Relationships Inventory was used (NRI; Furman & Buhrmeister, 1985). This inventory consists of 14-items which can be used to assess negative interaction and support between two siblings. The Dutch version of the NRI was shown to have adequate factor and construct validity (De Goede, Branje, & Meeus, 2009).

**Sibling Conflict.** The subscale Negative Interaction of the NRI was used to measure sibling conflict. This scale consists of 6 items. Sample items included "How much do you and your sibling argue with each other?" and "How much do you and your sibling hassle or nag one another?". The target adolescents answered these items on a Likert scale ranging from 1 (*never or hardly at all*) to 5 (*always or extremely much*) in reference to their sibling. The internal consistency of this scale was found to be good, indicated by Cronbach's  $\alpha$  ranging from .93 to .95 across all waves.

**Sibling Relationship Quality.** This variable was measured using the subscale Support of the NRI, which is used to measure the levels of support the adolescent experiences within the sibling relationship. This subscale consists of 8-items such as "How much do you care about your sibling?", "How much does your sibling appreciate the things you do?" and "How sure are you that this relationship will last no matter what?". The participants answered these items on a Likert scale ranging from 1 (*never or hardly at all*) to 5 (*always or extremely much*) in reference to their sibling. Internal consistency of this subscale was found to be good across all waves, indicated by Cronbach's  $\alpha$  ranging from .84 to .85 across all waves.

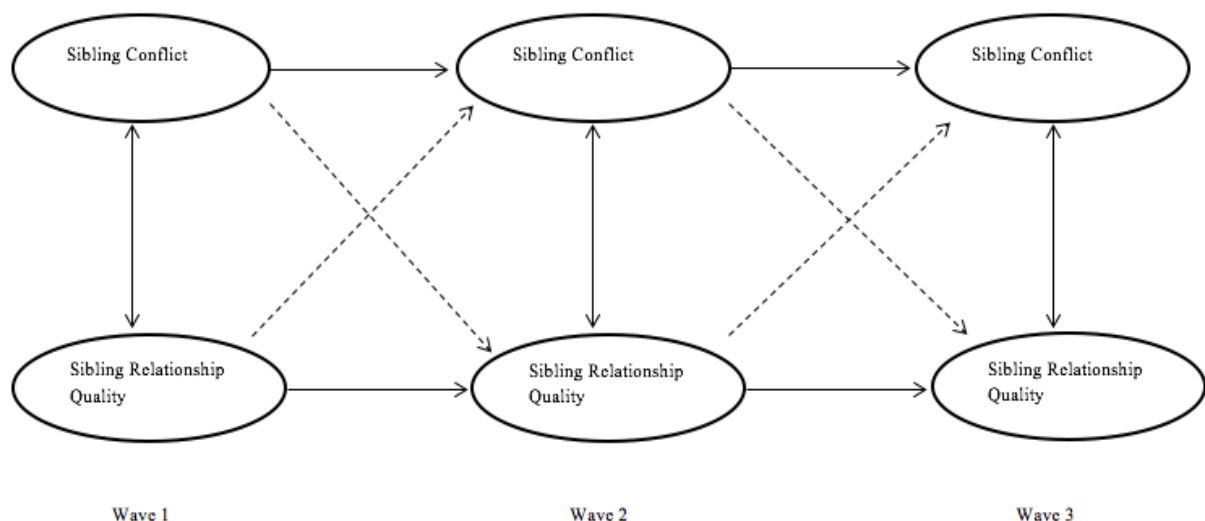
### Analytic Strategy

A cross-lagged panel model was used to study the association between sibling conflict and sibling relationship quality over three years. Across all waves, an average of 16.16% responses were missing per subscale. Little's Missing Completely at Random test (MCAR; Little, 1988) revealed a normed  $\chi^2 \left( \frac{\chi^2}{df} \right) = 28.677/18 = 1.69$ , indicating that the missingness across all waves can be regarded as ignorable. Hence, all data available in the analytic sample was used in our model. Preliminary analyses showed that only normality

was violated for the subscale Negativity across all waves, as shown by the analyses of Shapiro-Wilk test and visual inspection. None of other assumptions were violated.

We performed analyses using cross-lagged panel models (see Figure 1) using IBM SPSS Amos version 24. For each wave sibling Support and Negative Interaction were measured as latent variables with parcel scores as indicators. The use of a subset-item-parcel approach has beneficial effects for Structural Equation Modelling (SEM) regarding psychometrics and modelling (Matsunaga, 2008). For sibling Support and Negative Interaction, based on a correlational algorithm method, two 3-item parcels and two 4-item parcels were created respectively. By convention, 1 factor loading per latent variable was fixed to 1 in order to interpret the model. To examine longitudinal moderation of gender dyads, we performed multiple group analysis. This resulted in nested models in which we consecutively constrain more parameters to be equal for the different constellations (brother-brother, sister-sister and mixed sex).

The Tucker Lewis Index (TLI), Comparative Fit Index (CFI), and the root mean square error of approximation (RMSEA) were used to evaluate the fit of our model. The model fit is considered to be good if  $TLI \geq .95$ ;  $CFI \geq .95$  and  $RMSEA \leq 0.5$  (Byrne, 2016). Comparisons for the nested models were based on  $\Delta CFI$  and  $\Delta RMSEA$ , because Chen (2007) suggested these as size-insensitive means for comparing different models. Two of three of the following conditions should be met to indicate a significantly better model fit:  $\Delta TLI \geq .95$ ;  $\Delta CFI \geq .010$ ;  $\Delta RMSEA \geq .015$ .



*Figure 1.* Fully cross-lagged model. *Note.* Dotted arrows represent hypothesized direct cross-lagged effects. Arrows in black represent stability paths and bidirectional paths across Sibling Conflict and Sibling Relationship Quality.

## Results

### Descriptive Statistics

Means and standard deviations of the composite scores for Support and Negative Interaction are shown in Table 1. For these subscales, low to moderate correlation coefficients were found (Table 2).

Table 1

Descriptive statistics for Sibling Support and Negative Interaction

	Support		Negative Interaction	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Wave 1	3.21	.65	2.29	.76
Wave 2	3.26	.67	2.18	.78
Wave 3	3.25	.69	2.14	.81

Table 2

Bivariate Pearson Correlations for Support and Negative Interaction

	1	2	3	4	5	6
1. SP <sub>W1</sub>	-					
2. SP <sub>W2</sub>	.667**	-				
3. SP <sub>W3</sub>	.557**	.705**	-			
4. NI <sub>W1</sub>	-.441**	-.318**	-.208**	-		
5. NI <sub>W2</sub>	-.328**	-.350**	-.284**	.618**	-	
6. NI <sub>W3</sub>	-.226**	-.281**	-.290**	.533**	.636**	-

*Note.* SP = Support, NI = Negative Interaction, \*\*  $p < .01$ .

### Model Construction

We started with an unconstrained model and applied a stepwise procedure which included constraining one parameter at the time (see Table 3). Stability paths, cross-lagged paths and within-wave covariances could be constrained. That is, each added constrain did not result in a significantly worse model fit, with  $\Delta CFI$  below .010 and  $\Delta RMSEA$  below 0.15. Therefore, we used the fully constrained model indicating a good fit.

Table 3

Summary of Goodness-of-fit Statistics for Each Nested Model in Stepwise Procedure for Model Construction

Constraints added to each model	$\chi^2$	df	CFI	TLI	RMSEA
M1: Unconstrained model	91.439	35	.986	.968	.60
M2: NI autoregressive stabilities	91.455	36	.986	.970	.059
M3: SP autoregressive stabilities	93.371	36	.985	.968	.060
M4: Error covariances	92.353	36	.986	.969	.059
M5: Cross-Lagged NI to SP	91.445	36	.986	.970	.059
M6: Cross-Lagged SP to NI	91.449	36	.986	.970	.059
M7: Fully constrained	95.024	40	.986	.973	.056

*Note.* SP = Support, NI = Negative Interaction, CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation.

### **Sibling Support and Negative Interaction**

The results of the model for sibling support and negative interaction are shown in Table 4. The stability of both negative interaction and support across the first two waves was moderately high. For all waves, changes in Negative Interaction were significantly and negatively correlated with changes in Support. These findings indicate that an increase in Negative Interaction was associated with a decrease in Support and vice versa. There were no significant cross-lagged effects for sibling support and negative interaction.

Table 4

Final Model Parameter Estimates for Sibling Support and Negative Interaction

Regression path/covariance	<i>B</i>	<i>SE</i>	$\beta_1$	$\beta_2$	$\beta_3$
Stability paths					
NI	.711***	.036	.659*	.672*	
SP	.826***	.039	.786*	.800*	
Within-wave(error) covariances					
NI ↔ SP <sub>W1</sub>	-.212***	.027	-.487*		
NI ↔ SP <sub>W2/3</sub>	-.056***	.012		-.249*	-.238*
Cross-lagged paths					
SP <sub>W1/2</sub> → NI <sub>W2/3</sub>	-.043	.042	-0.35*	-0.34*	
NI <sub>W1/2</sub> → SP <sub>W2/3</sub>	.008	.028	.009	.009	

*Note.* *B* = unstandardized effects,  $\beta_1$  = Standardized effect between Time 1-2,  $\beta_2$  = Standardized effect between Time 2-3,  $\beta_3$  = Standardized effect within Time 3.

\* $p < .05$ ; \*\*\* $p < .001$ .

### Gender Constellation Differences

The analyses regarding differences for sister-sister, brother-brother and mixed sibling dyads revealed that stability paths, cross-lagged paths and within-wave covariances could be constrained across the different gender constellations. That is, constraining these parameters did not result in a significantly different model fit, with  $\Delta CFI$  and  $\Delta RMSEA$  ranging between .000 and .003. Therefore, it can be assumed that all relationships of the model are the same for the different sibling dyads, indicating no moderation effect of gender constellation.

Table 3

Summary of Goodness-of-fit Statistics for Each Nested Model in Stepwise Procedure for Model Construction

Constraints added to each model	$\chi^2$	df	CFI	TLI	RMSEA
M1: Unconstrained model	91.439	35	.986	.968	.60
M2: NI autoregressive stabilities	91.455	36	.986	.970	.059
M3: SP autoregressive stabilities	93.371	36	.985	.968	.060
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M5: Cross-Lagged NI to SP	91.445	36	.986	.970	.059
M6: Cross-Lagged SP to NI	91.449	36	.986	.970	.059
M7: Fully constrained	95.024	40	.986	.973	.056

*Note.* SP = Support, NI = Negative Interaction, CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation.

### Discussion

This study aimed to explore the association between sibling conflict and sibling relationship quality during early adolescence. First, sibling conflict as well as relationship quality showed relative stability over time. More importantly, conflict and relationship quality were found to be related within waves. Nevertheless, no cross-lagged effects were found, indicating that changes in conflict or relationship quality at one point in time did not predict changes in one another later on. Accordingly, no moderation effect of gender constellation was found.

Conflict as well as relationship quality showed relative stability over time, meaning that both constructs generally maintain the same levels over time. The stable environment in which the sibling relationship is embedded, might partly explain these findings, as this social environment generally stays the same in the period of measurement (13 till 15 years of age). Typically, factors such as family composition, housing situation and schooling are quite stable during these years (Arnett & Hughes, 2012). These environmental factors might add to the stability of characteristics of the sibling relationship.

Concerning the within-wave associations, the results of this study indicated that more conflict was related to less sibling relationship quality. Specifically, a higher level of relationship quality was related to a smaller extent of conflict between siblings in the first wave. This finding is in line with previous research which stated a negative relationship between sibling conflict and relationship quality (Campione-Barr & Smetana, 2010; Lindell et al., 2014). For the other waves, we found that changes in conflict were significantly and negatively related to changes in relationship quality. These findings conform to the social

learning perspective. That is, this theory suggests that certain types of behaviours become more frequent by processes of observational learning and reinforcement. This strengthening of behaviours can intensify either the negativity or positivity within the sibling relationship. For example, when negativity occurs, we would expect these behaviours to be intensified by principles of social learning, thereby lessening the possibilities for observation and reinforcement of positive behaviours which add to relationship quality. In this way, levels of relationship quality would be reduced. Hence, the social learning perspective provides a valuable framework for insights on changes within the sibling relationship.

Contrary to our expectations based on the study of Lindell et al. (2014), we failed to find cross-lagged effects between sibling conflict and relationship quality. This means that changes in conflict could not predict changes in relationship quality one year later and vice versa. These findings could partly be explained by the nature of the sibling relationship. Furman and Buhrmester (1985) argued that the siblings' childhood experiences contain a long history of interactions and this relationship is based on kinship. Given this long history of the sibling relationship in general, it may be that just one-time measures of sibling conflict or relationship quality cannot have a strong detectable effect on the other. That is, the levels of either conflict or relationship quality cannot be explained by the other at one time, yet are formed by a long history of previous behaviours adding to the complexity of this relationship.

Additionally, the co-occurrence of warmth/closeness and conflict is supported by the study of Buhrmester and Furman (1990) indicating that children could have ambivalent feeling about their siblings. In our study, conflict in earlier waves might not have influence on feelings of support and warmth in later waves as these behaviours can co-occur without affecting one another. Hence, a relationship with a history of conflictual behaviour might not diminish feelings of kinship and closeness later on.

Furthermore, we did not find a longitudinal moderation effect of gender for the association between sibling conflict and relationship quality, thereby rejecting our hypotheses. Previous research did find an effect for gender, however these studies had a cross-sectional design (Buhrmester, 1992; Furman & Buhrmester, 1985; Kim et al., 2007; McHale et al., 2013; Stocker, Lanther, & Furman, 1997). The absence of moderation in this study could be related to the overall lack of strong effects between the constructs. Furthermore, due to the way the sample was obtained, the different gender dyad constellations were uneven in size which could have complicated the comparability of these different groups. Thus, there is still the possibility that there would be an effect of gender for the association between conflict and relationship quality as indicated by earlier studies.

We recommend future research to take into account the gender dyad distribution of their sample.

### **Strengths, Limitations and Future Directions**

This study represents an important contribution to the few studies regarding the relationship between sibling conflict and sibling relationship quality. The large sample size, and the longitudinal design enable us to obtain deeper insight on the trajectory of sibling conflict and relationship quality in young adolescents. Additionally, contrary to previous research we have differentiated between sister pairs, brother pairs and mixed-sex pairs instead of dividing solely mixed-sex pairs and same-sex pairs. In doing so, we represent the complexity of different family systems.

Despite these strengths, the study also has a number of limitations. First, it should be acknowledged that the operationalization of the constructs we have chosen does not completely cover the content of sibling conflict and relationship quality. That is, we used the subscale 'Support' of the NRI as a measurement of relationship quality. However, this subscale solely measures the level of emotional support from the sibling perceived by the adolescent, yet our construct of relationship quality includes a broad range of behaviours and cognitions associated with the relationship between siblings. Likewise, this study aimed to use an operationalization of conflict that included solely the occurrence and intensity of conflicts. However, the used subscale 'Negative Interaction' included a broad range of negative behaviours such as nagging and complaining. Consequently, an inconsistency existed between the used measures and our operationalisations, as both subscales measured a broader construct than our operationalization. Therefore, we encourage future research to use more defined concepts of conflict and relationship quality which can be reflected more accurately by existing questionnaires.

Second, low overall levels of conflict were reported in this study, which obstructs the ability to find any effects of conflict. This could be due to the fact that we solely relied on self-reports to assess this construct. Although it has been shown that the NRI has sufficient psychometric properties, this questionnaire was not validated against actual observations of conflict between siblings. Using different sources of measurement would have benefited the assessment of sibling conflict in this study.

Third, the data used in this study included self-report measures of target adolescents on characteristics of the relationship with their sibling. This limits our assessment to the perspective of one sibling instead of taking into account the perspectives of other family members. Nevertheless, the nature of the questions used in the NRI attempts to include negative interaction and support by both siblings. That is, questions are



written to include conflict regardless of whether the target sibling or the other sibling initiated this conflict. Nevertheless, future research could investigate the sibling relationship more wholesome by including different perspectives to study conflict.

Furthermore, it should be noted that our sample consisted of young adolescents with a Dutch ethnicity and a medium-high socioeconomic status, therefore limiting the generalizability of our findings outside the Dutch population. Future research should obtain a more representative sample by recruiting participants with a variability in background.

### **Conclusion**

This study provided insights on the longitudinal associations between sibling conflict and sibling relationship quality and possible moderation effects of gender using multilevel analyses of longitudinal data from the RADAR-project. Results showed that, although sibling conflict and relationship quality were significantly related within waves, no cross-lagged effect were found. The sibling relationship is one of the most long-lasting and influential relationships in the lives of adolescents, further insights on both negative and positive characteristics of this relationship can be of great value to clinical practice as well as the existing literature.

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