Similarities and reciprocal influences in eating behavior within sibling pairs: A longitudinal study

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Abstract

The present study investigated similarities and reciprocal influences in emotional, external and restrained eating in adolescent siblings, and the moderating role of sex and quality of relationship. A total of 415 sibling pairs (aged 13–16 years) participated in this two-wave one-year longitudinal study. Analyses were conducted by means of Structural Equation Modeling. Cross-sectional findings demonstrated that siblings are moderately similar in their eating behavior. Longitudinal findings showed that the younger siblings exert a small influence on the emotional and external eating behavior of the older siblings. No support was found for the older siblings affecting the younger siblings in their eating behavior. Furthermore, no sex differences were found in the associations between sibling eating behaviors within and over time. However, we did find a moderating effect for the quality of the relationship concerning similarities in emotional eating. Future research focusing on various sociocultural influences on adolescents’ eating behaviors should also include younger siblings.

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Keywords: Siblings; Eating behavior; Similarities; Influences; Sex differences; Quality of relationship

1. Introduction

The prevalence of overweight and obesity among children and adolescents worldwide is still increasing (WHO, 2006). Insight into the etiology of eating behaviors is needed to prevent adolescents from developing unhealthy eating habits. Previous research focuses primarily on media, parents and peers as sociocultural factors which appear to be associated with adolescents’ eating behavior (e.g., Levine, Smolak, Moodey, Shuman, & Hessen, 1993; Pike & Rodin, 1991; Shroff & Thompson, 2006). However, siblings seem to be relatively neglected, which is remarkable given the importance of the role of siblings on several behavioral outcomes (Brody, 1998; Bullock & Dishion, 2002; Feinberg & Hetherington, 2000; Garcia, Shaw, Winslow, & Yaggi, 2000).

Previous findings among adolescent boys indicate that siblings are perceived to have at least some influence over boys’ body change methods, which includes exercise practices as well as eating habits (Ricciardelli, McCabe, & Banfield, 2000). In girls, siblings played a small role within restrained cognitions about eating (Vincent & McCabe,
In addition, siblings’ weight concerns seem to be related to those of older and younger girls and boys (McHale, Corneal, Crouter, & Birch, 2001). Unfortunately, research on sibling influences on actual eating behaviors is – to our knowledge – not existing. Because of the total lack of studies on siblings we think it is important to address some of the research on peer relationships, as mechanisms in these types of relationships might be comparable with mechanisms operating in sibling relationships. Many adolescent girls discuss body weight and dieting with their friends (Desmond, Price, Gray, & O’Connell, 1986; Wertheim, Paxton, Schutz, & Muir, 1996), and exposure to peer dieting techniques significantly accounted for variance in dieting in adolescent girls (Levine et al., 1993). In addition, dieting or weight-watching together with friends seem to provide social support for adolescent girls in losing weight, just for social comparison (Wertheim et al., 1996). These findings suggest that peer concerns with weight and shape might serve as cues for adolescent girls’ eating behavior. It seems plausible that sibling girls also affect each other through comparable mechanisms. However, the question arises whether adolescent boys seem to affect each others eating behavior through such processes as social comparison.

In general, girls seem to be more preoccupied with their weight (Phares, Steinberg, & Thompson, 2004) as they prefer to be thinner and were more dissatisfied with their body than boys (Furnham, Badmin, & Sneade, 2002). Ricciardelli et al. (2000) found that the majority of adolescent boys in their study were satisfied with their body, notwithstanding their attempts to increase the size of their muscles, to change their body shape or to change their body size. Due to the higher prevalence of eating-related problems among girls and women, many empirical studies have focused exclusively on female samples. In the present study, we examine similarities and reciprocal influences in eating behaviors for female and male siblings separately, as these associations may differ by sex.

Another factor which might affect influence processes between siblings is the quality of the sibling relationship. According to Brody (1998), siblings with a positive relationship will experience more opportunities to observe and to learn from each other. Through interactions and imitation, siblings might become similar in their cognitions and their subsequent behaviors. Feinberg and Hetherington (2000) reported higher homogeneity in behavioral outcomes in siblings with a high qualitative relationship than in siblings with a low qualitative relationship, implying that siblings who are warm towards each other and show empathy and companionship, tend to be more alike. Based on these research findings an effect of the sibling relationship on eating behavior outcomes might be expected. Siblings with a high qualitative relationship might be more likely to affect each other in their eating behavior than siblings with a low to moderate qualitative relationship.

In the present study we focused on three frequently examined eating behaviors, namely: emotional, external and restrained eating (e.g., Lluch, Herbeth, Mejean, & Siest, 2000; Wardle et al., 1992). In several studies these eating behaviors were found to be associated with overeating (e.g., Herman & Polivy, 1980; Rodin, 1980; van Strien, Engels, van Leeuwe, & Snoek, 2005), which is a risk factor for obesity. Emotional eating refers to eating in response to emotional arousal, like anger, fear or anxiety, while the usual response to a state of arousal is loss of appetite (Bruch, 1973; Greeno & Wing, 1994; Kaplan & Kaplan, 1957; Schachter, Goldman, & Gordon, 1968). External eating is eating in response to external and food-related stimuli, like the sight and the smell of food, but also its availability (Rodin, 1980). Finally, restrained eating refers to eating behavior that is affected by a self-imposed resistance to physiological pressures. Sociocultural factors, especially trendy ideals of slimness and disapproval of overweight, motivate restrained food intake (Herman & Polivy 1980).

In the current longitudinal study we investigated whether adolescent siblings influence each other in their eating behaviors by means of Structural Equation Modeling, which allowed us to disentangle reciprocal influences from similarities in eating behavior. This distinction is essential, as similarities obviously do not directly implicate that siblings influence each other. The present study is the first to investigate similarities and reciprocal influences in adolescent siblings’ emotional, external and restrained eating behavior.

2. Methods

2.1. Procedure

Participants of this study were Dutch families with at least two siblings aged between 13 and 16 years old (Harakeh, Scholte, de Vries, & Engels, 2005; van der Vorst, Engels, Meeus, Deković, & van Leeuw, 2005). Families were derived from the records of 22 municipalities in the Netherlands, and recruited by means of a letter. They were told that the study was about families and health. A total of 885 families were willing to participate. In order to
participate in this study parents had to be married or living together, family members had to be biologically related, and the children could not be twins. Other exclusion criteria were physical or mental disability in the children. A total of 765 families fulfilled these criteria. Finally, 428 families were selected to acquire an equal distribution of educational levels of adolescents and of sex. Both parents and two adolescent children of each family participated. Data collection took place between November 2002 and April 2003 for the first wave (T1) and one year later for the second wave (T2). The families were visited by a trained interviewer. All family members filled out a complete questionnaire individually, no interaction between family members was allowed when filling out the questionnaires. Each family received €30 per wave when all four family members had completed the questionnaires. The moment the study was completed, 5 families were selected at random to receive a €1000 travel cheque. In the present study, data of siblings who participated both at the first and second wave are utilized. A total of 416 families participated at T2, resulting in a response rate of 97%.

2.2. Sample characteristics

The majority of the participating adolescents were of Dutch origin (>95%). At the first wave the age of the older siblings ranged from 14 to 17 years, with a mean age of 15.22 (SD=.60) years. The age of the younger siblings ranged from 13 to 15 years, with a mean age of 13.36 (SD =.50) years. Sex of both siblings was almost equally divided: 47.2% of the older siblings and 52.3% of the younger siblings were girls at the first wave. At the first wave approximately one-third of all siblings followed special or low education, one-third followed an intermediate general education, and the remaining adolescents followed the highest level of secondary school, namely preparatory college and university education.

2.3. Measures

2.3.1. Quality of the sibling relationship

The quality of the sibling relationship was assessed with the Sibling Relationship Questionnaire (SRQ; Furman & Buhrmester, 1985). Both the older and the younger sibling of each family were asked to fill in a questionnaire individually. All 33 questions of the SRQ had to be scored on a 5-point scale from 1 (hardly at all) to 5 (very much). Questions on the SRQ are, for example: “How much fun do you and your brother/sister have?” and “How much do you and your brother/sister share things with each other?” A higher score on the SRQ implies a high qualitative relationship. Cronbach’s alpha coefficients were .88 for the older sibling, and .87 for the younger sibling. The mean score was 3.15 (SD=.38) for the older sibling and 3.19 (SD =.39) for the younger sibling. The Pearson correlation between the score of the older and younger siblings was .56 (p<.01).

2.3.2. Eating behavior

Eating behavior was measured with the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986). The DEBQ has 33 items, forming three separate scales: emotional eating, external eating and restrained eating behavior. The scale for emotional eating consists of 13 items and contains questions like: “Do you have a desire to eat when you are irritated?” The scale for external eating consists of 10 items, an example of a question is: “If foods smells and looks good, do you eat more than usual?” The scale for restrained eating consists of 10 items, an example of these items is: “Do you try to eat less at mealtimes than you would like to eat?” All these questions have to be scored on a 5-point scale from 1 (never) to 5 (very often). The DEBQ scales have satisfactory internal consistency, validity for food consumption, convergent and discriminative validity (van Strien, 2002). The DEBQ scales are suitable to be filled in by adolescents and have been used in other studies (e.g., Lluch et al., 2000; van Strien, 1996; Wardle et al., 1992). The alpha coefficients in the present study for the older and younger sibling were: .85 and .85 for external eating, .94 and .92 for restrained eating, and .93 and .92 for emotional eating, respectively. Table 1 presents means and standard deviations for the eating behaviors at both waves.

2.4. Strategy of analyses

First, descriptive analyses were conducted on the eating behaviors to examine differences between boys and girls, and to test differences between the older and younger siblings (Table 1). Furthermore, a two-wave model was tested
with Structural Equation Modeling using AMOS 5.0 (Arbuckle, 2003; Arbuckle & Wothke, 1999). The model in Fig. 1 represents the hypotheses concerning eating behavior in general, but this model was tested for each of the eating behaviors separately. In the model the eating behavior variables are considered as latent constructs. However, using all the individual items as indicators for each latent variable, the number of parameters to be estimated is too large with regard to the sample size. Therefore parcels are used as indicators for the latent variables (Bandalos & Finney, 2001; Nasser & Takahashi, 2003). Parcels are combinations of subsets of items. All latent constructs in the model were assessed by two parcels. Each parcel represented half of the variables at random selected scale items. The fit of the models was assessed by the following global fit indexes: $\chi^2$, GFI (Goodness of Fit Index), NFI (Bentler–Bonnett Index), AGFI (Adjusted Goodness of Fit Index) and RMSEA (Root Mean Square Error of Approximation). Because the chi-square goodness-of-fit test is sensitive to sample size, the fit indices GFI, NFI, AGFI and RMSEA were utilized additionally. These fit indexes are more robust and provide additional information about the fit of the model. Except for the values of the RMSEA (which is satisfactory with $<.08$), goodness-of-fit values greater than .90 are considered an acceptable fit (Arbuckle & Wothke, 1999; Bentler & Bonett, 1980; Hu & Bentler, 1999).

To test whether certain associations in the model differed between boys and girls, multi-group analyses were performed. In multi-group analyses, differences between groups can be examined by fixing the covariances and the $b$-coefficients and testing whether the model fit was significantly better for the model in which the paths were allowed to differ between the groups compared to the model in which the paths were constrained to be equal. Thus, to measure the moderating effect of sex, siblings were divided in the following groups: one group with exclusively girls (girl–girl dyads) and one with exclusively boys (boy–boy dyads). Subsequently, we executed multi-group analyses to investigate whether differences exists between girl–girl dyads and boy–boy dyads in cross-sectional correlations at the first wave, in stability paths and in cross-lagged paths. In the first step of this analysis a baseline $\chi^2$ of the model was computed per eating behavior variable with no equality constraints between the two sex groups (unconstrained model). In the next step, the cross-sectional, the stability and the cross-lagged paths were constrained to be equal. Then the $\chi^2$
of this constrained model was calculated. If $\chi^2$ increases significantly from step 1 to step 2 these paths would be significantly different across the sibling groups.

To measure the moderating effect of the quality of the sibling relationship, siblings were also divided in a high quality group and a low to moderate quality group. Therefore, the median split method was used (see also van der Vorst, Engels, Dekovic, Vermulst, & Meeus, 2006). Subsequently, we applied also multi-group analyses to investigate whether the associations in the model differed between the group of siblings with a high qualitative relationship versus the group of siblings with a low to moderate qualitative relationship.

3. Results

3.1. Descriptive analyses

$T$-tests were conducted to examine sex differences, and differences between the older and younger siblings in eating behaviors. We found higher scores on emotional eating for girls than for boys at both waves. For external eating, a significant difference was found only between the older sibling boy and the younger sibling girl at the first wave. At the second wave, the scores on external eating did not differ significantly between the sex and birth order groups. For restrained eating sex differences were found, with girls scoring higher on the restrained scale than boys at both waves. The older and the younger sibling boys differed on restrained eating at the first wave, but not at the second wave (Table 1).

To investigate associations between the eating behavior of the older and the younger sibling, correlations were calculated for all three eating behaviors at both waves. Small to moderate correlations were found between the older sibling and the younger sibling. At T1 the correlation between the siblings for emotional eating was $r(N=415)=.19$ ($p<.01$), at T2 this correlation was $r=.20$ ($p<.01$). For external eating these correlations were also positive (T1: $r=.25$, $p<.01$; T2 $r=.18$, $p<.01$). For restrained eating, correlations were $r=.20$, $p<.01$ (T1) and $r=.20$, $p<.01$ (T2) (Table 2).

3.2. Model findings

3.2.1. Total group

To investigate whether the older and the younger siblings are similar in their eating behavior and whether they influence each other over time, we tested a two-wave model (as depicted in Fig. 1) with structural equation modeling. The fit indices for the emotional eating model were $\chi^2 (df=12, N=415)=23.12$, GFI= .986, NFI=.992, AGFI=.959 and RMSEA=.047. For external eating the fit indices were $\chi^2 (df=13, N=415)=32.86$, GFI= .982, NFI=.980, AGFI=.949 and RMSEA=.061 and for restrained eating $\chi^2 (df=13, N=415)=11.00$, GFI=.993, NFI=.996, AGFI=.982 and RMSEA=.000. These results indicated that the a priori measurement models permit adequate tests of the hypothesized multi-group models.

Table 2
Correlations between the model variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<td>.25**</td>
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<td>.26**</td>
<td>.02</td>
<td>.57**</td>
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<td>9—Re. O2</td>
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<td>.26**</td>
<td></td>
<td>.02</td>
<td>.57**</td>
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<tr>
<td>10—Em. Y2</td>
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<td></td>
<td>.18**</td>
<td>.39**</td>
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<tr>
<td>12—Re. Y2</td>
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<td></td>
<td></td>
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<td>.05</td>
</tr>
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</table>

Note. Em = Emotional eating, Ex = External eating, Re = Restrained eating, O = older siblings, Y = younger siblings, 1 = first wave, and 2 = second wave. * $p<.05$, ** $p<.01$. 

The cross-sectional correlations between the older and the younger sibling for the total sample showed a positive correlation between external eating of the older and the younger sibling at the first wave ($r=.20, p<.01$) and at the second wave ($r=.22, p<.01$). These correlations were also found significant for external eating ($r=.27, p<.01$ at the first wave and $r=.17, p<.01$ at the second wave) and restrained eating ($r=.22, p<.01$ at the first wave and $r=.19, p<.01$ at the second wave). Over a one-year period all three eating behaviors appeared to be relatively stable, for the older siblings as well as for the younger siblings. Standardized estimates for the cross-lagged paths showed an association of emotional eating of the younger sibling at the first wave and emotional eating of the older sibling at the second wave ($\beta=.13, p<.01$). This path is also found in external eating ($\beta=.12, p<.01$) but not in restrained eating (Tables 3–5).

### 3.2.2. Multi-group comparisons: boys versus girls

To investigate whether similarities and reciprocal influences between siblings differ by sex, the models for male sibling pairs ($n=106$) were compared with the models for female sibling pairs ($n=102$). The $\chi^2$ ($df=24$) of the unconstrained emotional eating model for the two sex groups was 27.23. A chi-square test demonstrated that the constrained model did not significantly differ from the unconstrained model ($\chi^2$ change ($df=5)=3.28, p=.66$), implying that the model parameters did not differ between boys and girls. The $\chi^2$ ($df=25, n=208$) of the unconstrained external eating model was 36.36. Multi-group analyses demonstrated no significant differences between girls and boys in external eating ($\chi^2$ change ($df=5)=3.13 p=.68$). The $\chi^2$ ($df=25, n=208$) of the unconstrained restrained eating model was 22.76. Multi-group analyses also showed no significant differences between girls and boys in the restrained eating model ($\chi^2$ change ($df=5)=5.44, p=.37$) (Tables 3–5).

### Table 3
Standardized estimates for both sex groups and for both sibling relation groups in the model for emotional eating

<table>
<thead>
<tr>
<th>Emotional eating</th>
<th>Total sample</th>
<th>Girl dyads</th>
<th>Boy dyads</th>
<th>High SRQ</th>
<th>Low SRQ</th>
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<tr>
<td></td>
<td>$N=415$</td>
<td>$N=102$</td>
<td>$N=106$</td>
<td>$N=192$</td>
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<tr>
<td>Path</td>
<td>Cross-sectional correlations between latent variables</td>
<td></td>
<td></td>
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<tr>
<td>Older T1 – younger T1</td>
<td>.20 ***</td>
<td>.27 *</td>
<td>.10</td>
<td>.40 ***</td>
<td>.05 *</td>
</tr>
<tr>
<td>Older T2 – younger T2</td>
<td>.22 ***</td>
<td>.34 ***</td>
<td>.18 *</td>
<td>.34 ***</td>
<td>.09</td>
</tr>
<tr>
<td>Older T1 – older T2</td>
<td>.65 ***</td>
<td>.53 ***</td>
<td>.61 ***</td>
<td>.61 ***</td>
<td>.69 ***</td>
</tr>
<tr>
<td>Younger T1 – younger T2</td>
<td>.66 ***</td>
<td>.68 ***</td>
<td>.51 ***</td>
<td>.64 ***</td>
<td>.66 ***</td>
</tr>
<tr>
<td>Older T1 – younger T2</td>
<td>.06</td>
<td></td>
<td>.11</td>
<td>.13</td>
<td>.02</td>
</tr>
<tr>
<td>Younger T1 – older T2</td>
<td>.13 *</td>
<td>.19 *</td>
<td>.10</td>
<td>.12 *</td>
<td>.10</td>
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</tbody>
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Note. High SRQ refers to the group of siblings who consider the quality of the sibling relationship as high, and Low SRQ to the group of siblings who consider this quality as low to moderate.

### Table 4
Standardized estimates for both sex groups and for both sibling relation groups in the model for external eating

<table>
<thead>
<tr>
<th>External eating</th>
<th>Total sample</th>
<th>Girl dyads</th>
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<td>.23 **</td>
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<td>Older T2 – younger T2</td>
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<td>.07</td>
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<td>.16 **</td>
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<td>Older T1 – older T2</td>
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<td>.71 ***</td>
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<td>.76 ***</td>
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<td>Younger T1 – younger T2</td>
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<td>Younger T1 – older T2</td>
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<td>.18</td>
<td>.10</td>
<td>.13</td>
<td>.10</td>
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</table>

Note. High SRQ refers to the group of siblings who consider the quality of the sibling relationship as high, and Low SRQ to the group of siblings who consider this quality as low to moderate.

*$p<.05$, **$p<.01$, ***$p<.001$. 
Table 5
Standardized estimates for both sex groups and for both sibling relation groups in the model for restrained eating

<table>
<thead>
<tr>
<th>Path</th>
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<th>Boy dyads</th>
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<td>N=102</td>
<td>N=106</td>
<td>N=192</td>
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<td>.22 ***</td>
<td>.20</td>
<td>.28 *</td>
<td>.33 ***</td>
<td>.11</td>
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<tr>
<td>Stability paths (betas)</td>
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<td>.36 ***</td>
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<td>Cross-lagged paths (betas)</td>
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<td>.66 ***</td>
<td>.66 ***</td>
<td>.74 ***</td>
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<td>Older T1 – younger T2</td>
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<td>.08</td>
<td>.17 *</td>
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<td>.04</td>
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<tr>
<td>Younger T1 – older T2</td>
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<td>.03</td>
<td>.21 *</td>
<td>.07</td>
<td>.01</td>
</tr>
</tbody>
</table>

Note. High SRQ refers to the group of siblings who consider the quality of the sibling relationship as high, and Low SRQ to the group of siblings who consider this quality as low to moderate.

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

3.2.3. Additional multi-group comparisons: same-sex versus different-sex

Multi-groups analyses in which the model findings of the boys were compared with the model findings of the girls revealed no differences between the same-sex groups. To examine whether similarities and reciprocal influences between sibling might differ for same-sex versus opposite-sex, we compared the following four groups with each other: a group with boy–boy dyads (n = 106), a group with girl–girl dyads (n = 102), a group with girl–boy dyads (n = 92), and a group of boy–girl dyads (n = 115). The $\chi^2$ (df=48, n=415) of the unconstrained emotional eating model for the four sex groups was 71.38. A chi-square test demonstrated that the constrained model did not significantly differ from the unconstrained model [$\chi^2$ change (df=15) = 8.54, p = .90], implying that the model parameters did not differ between the several sex-dyads. The $\chi^2$ (df=49) of the unconstrained external eating model was 58.29. Multi-group analyses demonstrated no significant differences between the four sex groups in external eating [$\chi^2$ change (df=15) = 9.93, p = .82]. The $\chi^2$ (df=49) of the unconstrained restrained eating model was 51.40. Multi-group analyses also showed no significant differences between the four sex groups in the restrained eating model [$\chi^2$ change (df=15) = 16.82, p = .33].

3.2.4. Multi-group differences: quality of sibling relationship

To investigate whether similarities and reciprocal influences between siblings were moderated by the quality of the sibling relationship, the sample was divided into two groups. The models of siblings with a high qualitative sibling relationship (n = 192) were compared with those with a low to moderate qualitative relationship (n = 206). These tests showed the following findings. The $\chi^2$ (df=24, n=398) of the unconstrained emotional eating model for siblings relation groups was 29.83. Multi-group analyses demonstrated significant differences between both sibling groups in the emotional eating model [$\chi^2$ change (df=5) = 14.77, p < .05]. To determine which pathways significantly differ from each other we utilized chi-square tests in which specific pathways were constrained to be equal. These chi-square tests per pathway represented a significant higher cross-sectional correlation between emotional eating of the older sibling and emotional eating of the younger sibling in the group of siblings with a high qualitative relationship [$\chi^2$ change (df=1) = 12.50, p < .01]. Further, no significant differences between both sibling groups were found in the emotional eating model (see parameters in Table 3). The $\chi^2$ (df=25, n=398) of the unconstrained external eating model was 35.81. Multi-group analyses demonstrated no significant differences between both sibling groups in the external eating model [$\chi^2$ change (df=5) = 4.33, p = .50] (Table 4). The $\chi^2$ (df=25, n=398) of the unconstrained restrained eating model was 24.49. Multi-group analyses showed no significant differences between both sibling groups in the restrained eating model [$\chi^2$ change (df=5) = 7.34, p = .20] (Table 5).

4. Discussion

The aim of the present study was to investigate similarities and reciprocal influences in adolescent siblings’ eating behavior. Sex differences, and differences between siblings with a high qualitative relationship versus those with a low to moderate qualitative relationship, in models were tested. First of all, female adolescents reported higher levels of emotional eating and restrained eating than male adolescents, which is in line with the findings of Lluch et al. (2000) and Wardle et al.
(1992). Besides the difference between the older sibling boy and the younger sibling girl at the first wave, no sex differences between average scores on external eating were found at both waves. These results confirm the findings of Lluch et al. (2000) and Wardle et al. (1992), in which no sex difference were found in children’s external eating.

Similarities in emotional, external and restrained eating were found between siblings. Moreover, an influence of the younger sibling on the older sibling was found for emotional and external eating. These findings indicate that siblings are modestly similar in their eating behavior and that younger siblings influence older siblings in emotional and external eating. It is, however, surprising that the younger siblings influence the older ones, because older siblings are generally viewed as an influential source of guidance, advice, support and knowledge for younger siblings (e.g., Jenkins Tucker, Barber, & Eccles, 1997). A possible explanation, especially for adolescent girls, might be that the older siblings, due to puberty, are not as thin as their younger siblings, which might leads to processes of social comparison whereby the older sibling prefers to look like the younger sibling. After all, in the current Western society, being thin is highly valued among women (Thompson & Stice, 2001). This thin ideal might lead the older sibling to imitate the eating behavior of the younger sibling. Future research should investigate whether and why older siblings imitate the younger siblings.

Findings concerning similarities in emotional, external and restrained eating between siblings, indicate no differences between sibling boys and sibling girls. To our knowledge, the present study is the first which explicitly examines sex differences in eating behavior among adolescent siblings. Based on these results one might conclude that, although boys and girls differ in their eating behavior, the degree of similarity and reciprocal influences do not differ by sex. In short, having a same-sex sibling is of the same importance for adolescent girls as for adolescent boys with respect to eating behavior. Moreover, additional analyses did not point out significant differences between all possible sex-dyads, which indicates that having a same-sex sibling is of the same importance for adolescents as having a opposite-sex sibling. In sum, that the younger sibling affects the older sibling in emotional and external eating seems not to differ for the different dyads. Future studies should examine exactly how younger siblings influence the older siblings in their eating behavior.

Finally, the tests concerning the quality of the sibling relationship produces an interesting finding. We expected that siblings with a high qualitative relationship would be more similar in eating behavior than siblings with a low to moderate qualitative relationship. This hypothesis was confirmed for emotional eating, implying that siblings who are warm towards each other, show affection and empathy, and who are involved with each other and communicate, tend to be more alike in their emotional eating behavior. These findings conform with results from Feinberg and Hetherington (2000), who reported significantly higher associations in other behavioral outcomes between siblings with a high qualitative relationship than in siblings with a low qualitative relationship. The findings of the present study suggest a potential moderating effect of the quality of the sibling relationship that contributes considerably to similarities in emotional eating behavior in siblings. Unexpectedly, this effect was not found for external and restrained eating. An explanation is that external and restrained eating are more directly observable behaviors, which might result in imitation processes, whether the adolescent likes the model (i.e. the sibling) or not. This might explain why similarities in external and restrained eating within siblings exist irrespective of the quality of their relationship.

Longitudinal analyses over a one-year period showed that siblings hardly influence each other over time, and that the quality of the sibling relationship and sex does not affect these associations. A possible explanation is that eating behavior is relatively stable over a one-year period. Siblings may have already developed a specific eating behavior pattern before they enter the teenage years. Collins (1990) suggests that the onset of disparate figure perceptions and expectations regarding thinness is already evident among six- and seven-year-old girls. Moreover, these dieting concerns were found to be related to restrained eating behavior among nine-year-old girls (Hill & Robinson, 1991). Perhaps influence processes have already taken place and resulted in similarities in eating behavior. Another explanation might be that similarities within siblings are due to factors other than reciprocal influences. Genetic and shared environmental factors may cause some siblings to have similar characteristics, interests and behaviors. Because of these characteristics, interests and behaviors, these siblings presumably spend more time with each other and therefore develop a higher qualitative relationship than siblings who have no or less comparable characteristics, interests and behaviors. In short, a high qualitative relationship might be the consequence of similarities within siblings, rather than the reason. Nevertheless, although adolescent siblings are similar in their eating behavior, this does not necessarily imply that they influence each other in their eating behavior. In recent studies, genetic factors are found of great importance in several forms of eating behavior (e.g., de Castro & Lilenfeld, 2005; Tholin, Rasmussen, Tynelius, & Karlsson, 2005). Families share genes and environment, and it should be noted that our full family design cannot
distinguish between the effects of these two factors. Future research should therefore employ a genetic informative design, such as a twin or adoption design, to disentangle modeling from heritability effects.

Although our longitudinal design with reports on eating behaviors of both siblings has some strong features, a few limitations should be discussed. First, the study relied solely on self-reported data, including data from diaries, data from parents and observational research would improve the reliability. Second, to test the hypotheses concerning sex and quality of the sibling relationship relatively small groups were constructed which reduced the statistical power to detect significant differences between groups. Third, the interval between the first and second wave was one year; this interval may be too small to make assumptions concerning the influence of siblings on eating behavior over a period of time. Research is needed with a prolonged time interval to test assumptions about the influence of siblings on eating behavior. Sibling influences on eating behavior within a younger sample could also be examined, because siblings may have a stronger influence on each other in childhood when eating patterns have not yet stabilized. Fourth, the current sample was relatively homogenous regarding age and ethnicity, and consisted of intact families and biologically-related siblings. Finally, in the present study, differences by sex and the quality of the sibling relationship were investigated. Although these findings shed some light on eating behavior developments within adolescent siblings, other important shared (e.g., family climate, marital relationship) and non-shared environmental factors (e.g., differential parental treatment, specific life events, differential peer-group characteristics, and factors such as personality) were not included in our analyses. Future prospective investigations of environmental factors and genetic resemblance might provide insight into the several influences on eating behavior and eating pathology in siblings.

Notwithstanding these limitations, the present study has focused on a relatively neglected factor within research concerning adolescents’ eating behavior. Findings of this study imply that younger siblings seem to be a small but important socializing agent within the adolescents’ sociocultural environment with respect to eating behavior. Therefore, in future studies investigating multifactor models relating to adolescents’ eating behavior, especially younger siblings should not be disregarded.

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