At risk of depression and anxiety
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Chapter 5

Gender differences in the relation between social support, problems in parent-offspring communication, and depression and anxiety

Gender differences in the buffer-effect of social support in the relation between stressful circumstances and
the development of depression and anxiety disorders are widely assumed, but few studies address this three-
way interaction between gender, stress, and support. Data in the present study came from the baseline
assessment of the Adolescents at Risk of Anxiety and Depression (ARLADNE) study in 502 adolescent
and young-adult children of 356 parents in the Netherlands with a depression, panic disorder and/or
obsessive-compulsive disorder. Results indicate that the daughters benefit more from social support than the
sons when problems in parent-offspring communication are high, but that this effect holds only for
depression symptoms and particularly in relation to problems in father-offspring communication. Social
support does not seem to play a role in the development of anxiety.

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Research (NWO-MW). We would like to thank Roelie Nijzing, Aukelien Mulder, and Jaap
Jansen for assistance in the data collection, Liesbeth Lindenboom for data entry, and Gert
ter Horst and Christel Westenbroek for scientific discussion about the origins and
consequences of gender differences in social support.
Introduction

Although gender differences in the buffer-effect of social support in the relation between stress and depression and anxiety are widely assumed, gender, stress, and support have rarely been studied simultaneously. To our knowledge, two studies explored this issue (Olstad, Sexton, & Søgaard, 2001; Rubin et al., 1992), but did not find a significant three-way interaction. Both studies used normal population samples, while the effects of social support and stress are thought to be most salient in individuals with a higher risk to develop depression and anxiety (Garber & Flynn, 2001). Offspring of parents who suffer from depression and/or anxiety develop these psychiatric problems 2 to 6 times more often than offspring of unaffected parents (e.g., Lieb et al., 2002; Merikangas et al., 1999). The present study explores the three-way interaction between gender, social support and stress in a sample of adolescent and young-adult offspring of patients suffering from depression, panic disorder and/or obsessive-compulsive disorder.

Due to the symptoms of depression and anxiety disorders, interactions between affected parents their offspring can suffer from parental negativity, inattentiveness, criticism, irritability (Johnson et al., 2001; Radke-Yarrow & Klimes-Dougan, 2002), dissatisfaction (Hirschfeld et al., 1997), over-control, and lack of expressed warmth by the parent (Whaley, Pinto, & Sigman, 1999). Garber and Flynn (2001) report that high-risk offspring experience more conflicts with their parents than their peers. The present study focuses on problems in the communication between the adolescent or young-adult and both parents as a measure of stress. We expect that offspring experiencing problematic parent-child communication report more depression and anxiety symptoms than those reporting few or no communication problems.

Social support is considered to be an important environmental factor in the onset and course of depression and anxiety disorders. Higher levels of social support are related to lower levels of depression and anxiety (e.g., Procidano & Walker Smith, 1997; Robinson & Garber, 1995; Sarason et al., 1983), and, although findings remain inconclusive (e.g., Cohen & Wills, 1985; Lepore, Evans, & Schneider, 1991; Monroe, 1983; Monroe et al., 1983; Wade & Kendler, 2000a; Windle, 1992), it is widely assumed that social support also buffers stress (Gottlieb, 1994; Kessler, Price, & Wortman, 1985; Olstad, Sexton, & Søgaard, 2001). The availability of emotional support and the perception that one can rely on one’s network when needed appears to decrease the influence of stressful circumstances on the development of psychiatric symptoms (Cohen & Wills, 1985; Kessler, Price, & Wortman, 1985). Increase or onset of psychiatric problems in high-risk young people may be prevented by social support from parents, siblings, members of the extended family, and peers (e.g., Goodman & Gotlib, 2002; Luthar & Zigler, 1991; Phares,
Duhig, & Watkins, 2002). We therefore expect that when social support is available and perceived as sufficient, the extent to which high-risk offspring experience depression or anxiety decreases, not only through its direct influence, but also through its buffering effect.

It is well-established that females are more vulnerable to the development of depression (Cyranowski et al., 2000; Garber & Flynn, 2001; Hops, 1996). Gender differences have been reported in the exposure and reactivity to stressors and social support, giving rise to the assumption that the pathogenic effect of these factors is different for males and females.

Kendler, Thornton, and Prescott (2001) found that males were more sensitive to work problems and divorce or separation, while females were more sensitive to problems in getting along with individuals in their proximal network. Such interpersonal problems are widely reported to result in more symptoms in females than in males (Nolen-Hoeksema, 2001; Seiffge-Krenke, 1995; Wagner & Compas, 1990). Therefore, problems in parent-adolescent communication are expected to affect high-risk daughters more than sons.

Concerning social support, females tend to report larger social networks than males and turn to others for emotional support in stressful circumstances more than males do (Ashton & Fuehrer, 1993; Frydenberg & Lewis, 1993; Seiffge-Krenke, 1995; Taylor et al., 2000). It is therefore argued that females' sense of wellbeing is more strongly influenced by the availability and quality of social support relations (Cyranowski et al., 2000; Flaherty & Richman, 1989). In line with this, research indicates that females report more depression symptoms than males when they experience a lack of social support (Brugha et al., 1990; Slavin & Rainer, 1990), and profit more from support when it is available (Matthews, Stansfeld, & Power, 1999; Taylor et al., 2000). Because females tend to turn to their social support relations when they experience stress, rather than coping by “fight versus flight”, they are more likely than males to benefit from available support in confining the consequences of stress (Taylor et al., 2000). Indeed, several authors (e.g., Kaltiala-Heino et al., 2001; Olstad, Sexton, & Søgaard, 2001) have reported that the buffer-effect of support in females seems stronger than that in males. We therefore expect that social support is of greater importance to high-risk daughters than it is to high-risk sons. Assuming that daughters suffer more from problems in parent-offspring communication, but also benefit more from social support than sons, we expect that when problems in parent-offspring communication are high the gender difference in level of symptoms is smaller when social support is available than when it is not.

Research on the effect of social support has mainly focused on depression. It is therefore unclear whether stress, social support, and gender differences play the same role
in the development of anxiety as in the development of depression. Depression and anxiety are considered to be distinct disorders, but probably share a number of risk factors (e.g., Kendler et al., 2003). Examining depression and anxiety symptoms simultaneously gives us the opportunity to explore the specificity of the hypothesised effects (Hammen, 2001, 2002; Wade & Kendler, 2000b). We hypothesise that the effects of gender, problems in parent-adolescent communication, and perceived social support are similar for depression and anxiety symptoms.

In sum, the present study investigates the relations between gender, stress, and social support in their association with depression and anxiety symptoms in a sample of adolescent and young-adult offspring of parents suffering from depression, panic disorder, and/or obsessive-compulsive disorder. We focus on problems in parent-offspring communication and perceived social support. We hypothesise a three-way interaction that shows that when problems in parent-child communication are high, the differences between males and females in levels of symptoms are larger in the situation that perceived support is low than in the situation that perceived support is high. We hypothesise further that this effect holds for both depression and anxiety symptoms.

Method

Participants and procedure
The present study was conducted on data from the base-line assessment of the ARIADNE-study. This is a large prospective study among 524 adolescents and young-adults and 366 parents into the development and course of depression and anxiety disorders among offspring of psychiatric patients. Parents were recruited via psychiatric services in the three northern provinces of the Netherlands. Information about the study was mailed to 4470 patients who were at least once treated for depression, panic disorder, and/or obsessive-compulsive disorder. They were asked to confer with their biological children (aged between 13 and 26 years old) about participation. A total of 1209 parents had children within the age-range and were eligible to participate, 366 agreed to participate (8% of total group; 30% of eligible group) and 843 (19% of total group; 70% of eligible group) refused. Of the 3261 other parents 858 persons did not reply (19%); 420 persons (9.5%) were moved away from the area, deceased or otherwise not eligible for participation; 1404 (31.5%) persons had no biological children within the age-range; and 579 persons (13%) refused to participate without providing information about children.
After consent was obtained, appointments for the individual interviews with parents and offspring were made. Participants were interviewed at home or at the Department of Psychiatry by trained interviewers. Both offspring and parents were interviewed with the Composite International Diagnostic Interview (CIDI) WHO-2000 version (Alonso et al., 2002) to assess clinical depression and anxiety. Parents were also interviewed about the presence of depression, panic, and/or obsessive-compulsive problems in their child’s other biological parent. In addition to the interview participants filled in questionnaires. The data in the present study include the DSM-IV questionnaire (Hartman, 2002), the Social Support Questionnaire short-form (Sarason et al., 1987), and the Parent-Adolescent Communication Scales (Barnes & Olson, 1995).

The present study used data from 502 adolescents and young-adults with complete data (215 males and 287 females) between 13 and 25 years old ($M=18.8$, $SD=3.3$). By means of the CIDI, 164 out of the 502 participants were diagnosed with at least one DSM-IV lifetime disorder: 112 with a depression disorder and 114 with an anxiety disorder (38 Panic Disorder; 16 Agoraphobia, 32 Obsessive-Compulsive Disorder, 37 Social Phobia, 30 Generalised Anxiety Disorder, 19 Separation Anxiety Disorder, and 20 Adult Separation Anxiety Disorder). Fifty-nine out of these 164 reported an episode in the month preceding the interview.

The participants came from 356 families (106 fathers and 250 mothers were contacted). Eighty percent of the participants ($n=409$ participants) had parents with an age-of-onset $\geq 10$ years before assessment, mean number of years between age-of-onset and assessment was 22 years ($SD=11.8$), 60% of the parents (of 304 participants) reported that they suffered a third or more of their lives (since onset) from depression or anxiety disorders. One hundred forty-seven parents (of 204 participants) reported episodes in the year preceding the interview, 134 parents (of 189 participants) out of 147 reported that this interfered in their personal relationships. Four hundred ninety-five participants (98.6%) experienced parental episodes of depression and/or anxiety during their lives. In 100 families (116 participants) the other biological parent had depression and/or anxiety problems as well, in 72 families (138 participants) only the father, and in 184 families (248 participants) only the mother was affected.

**Measures**

**Depression and anxiety symptoms.** Depression and anxiety symptoms were measured by means of the DSM-IV Questionnaire (Hartman, 2002; Hartman et al., 2001). Offspring were asked to report on a 4-point Likert-scale to what extent descriptions of symptomatic
behaviour accurately describe their behaviour at the time of measurement and/or in the preceding 12 months. The DSM-IV Questionnaire includes items referring to depression and a broad range of anxiety disorders. To create scales for depression and anxiety symptoms that differentiate between these problems as much as possible, we conducted a factor analysis with a two-factor solution on the 17 depression and 18 panic and somatization items. We constructed two scales such that only those items were selected which loaded on their own factor with a loading $\geq 0.30$ and a difference $\geq 0.20$ between this main loading and the additional loading on the other factor. The Depression symptoms scale consists of 14 items, e.g. “I am often unhappy” and “I am low in energy or feel tired for no reason”. The Anxiety symptoms scale consists of 16 items, e.g. “I suddenly become very anxious or panicky for no reason” and “I often feel sick to my stomach”. Internal consistency reliability is 0.92 for the Depression scale and 0.88 for the Anxiety scale. Participants with a recent episode of depression had a significantly higher mean score on depression symptoms ($t=11.20, p<0.001$; effect size $d=1.72$) and participants with a recent episode of anxiety had a significantly higher mean score on anxiety symptoms ($t=7.45, p<0.001$; effect size $d=1.31$) than those without a (current) depression and/or anxiety diagnosis. ROC analyses showed that at the optimal cut-off point sensitivity was 0.87 and specificity 0.85 when the depression symptoms score is used to predict recent clinical depression. For anxiety symptoms sensitivity was 0.80 and specificity 0.77 in predicting recent clinical anxiety. The DSM-IV Questionnaire has the advantage that we were able to measure subclinical levels of symptomatology in our high-risk group.

Social support. The SSQ-shortform (Sarason et al., 1987) was used to collect information on two aspects of perceived social support; number of (different) persons from whom support is received and overall satisfaction with social support received from these persons. This instrument consists of six items that describe different aspects of social support, e.g. “Whom can you really count on to be dependable when you need help?” and “Who accepts you totally, including both your worst and your best points?” Subjects report for each item those persons from whom they receive the described support and, on a six-point Likert-scale, their overall satisfaction with the support they experience. These two aspects of perceived social support are combined in one perceived social support score by summing the standard scores of the Number and Satisfaction scales.

This instrument was translated in Dutch for the purpose of this study. The translation procedure incorporated 2 iterations of translations from English to Dutch by the authors and back translations from Dutch to English by an independent researcher blind to the original English version. The SSQ comes with extensive instruction. To
ensure subjects were well informed, the SSQ was administered during the interview so subjects could be instructed orally by the interviewer. The interviewers especially stressed that each item on the SSQ taps a different form of support and, therefore, should be considered separate from the other items.

We consider the items of the SSQ-shortform to be neutral regarding gender, that is, the items do not represent support particularly experienced or preferred by either males or females. Internal consistency reliability was 0.87 for the Number (of support providers) scale, 0.86 for the Satisfaction scale, and 0.84 for the combined scale.

Problems in parent-offspring communication. By means of the Dutch translation of the Parent-Adolescent Communication Scales (Barnes & Olson, 1995; Jackson et al., 1998; Ligthart, 1987) participants reported on the extent to which descriptions of problems (e.g., “My mother/father tends to say things to me that are better left unsaid”) and openness (e.g., “I feel comfortable to discuss problems with my mother/father”) in the communication with parents apply to their own situation. This was done separately for the father and the mother. The resulting Problems score and Openness score were summed for a total score (Jackson et al., 1998; Ligthart, 1987). By reverse scoring the Openness scale, the summed composite represents the extent to which the participant experiences a problematic communication with his/her biological parents.

The original response option “Do not agree/do not disagree” was removed, leaving four answering categories: “Strongly agree”, “Agree”, “Disagree”, and “Strongly disagree”. Reliability-coefficients were 0.91 for the Openness scale and 0.85 for the Problems scale; correlation between these two scales was 0.672 (p<0.001). The combined scale showed a reliability coefficient of 0.93.

Data analysis
Since 95 families participated with two children, 18 with three, and 5 with four children, the data cannot be treated as a sample of 502 independent, interchangeable observations. Members from one family tend to be more alike . To account for this dependency or, in other words, variability between both individuals and families, analyses were conducted using hierarchical linear regression. As a first step so-called empty models are fitted for the dependent variables, i.e. depression symptoms and anxiety symptoms. Empty models do not contain predictor variables. Symptomatology is therefore the sum of a general mean, a random effect at the individual level, and a random effect at the family level. Dividing the family-level variance by the sum of family level and individual level variance results in the
intra class correlation coefficient $\rho_{YY}$). This coefficient can be interpreted as the fraction of total variability that is due to the family level (Snijders & Bosker, 1999), in other words, the extent to which family-membership is relevant in predicting symptoms. In contrast, in the Ordinary Least Squares (OLS) empty model symptomatology is the sum of a general mean and general residual individual variance. Comparison of the deviance of the OLS empty model with that of the hierarchical linear empty model shows, by means of a chi-square test, whether the distinction between variability at the family and the individual level provides a better fit to the data. (Deviance is a measure of lack of fit between data and model.)

The following step is the inclusion of the explanatory variables, i.e. gender, perceived social support, and problems in parent-offspring communication. Interactions are calculated as the cross-product of the first order effects. In these analyses, apart from gender, which is a “dummy” variable (male versus female; male is coded 0 and female 1) variable, all the predictor variables are continuous. These variables were transformed into standard scores in order to avoid ambiguities of interpretation as well as computational problems due to multicollinearity that may occur with variables and their products (Aiken & West, 1991).

The extent to which the full model explains variance in adolescent depression and anxiety symptoms ($R^2$) is calculated on the basis of the sums of family level and individual level variance in the hierarchical linear empty model and the full model. Dividing the full-model variance by the empty model variance and deducting the result from 1 gives explained variance $R^2_f$ (Snijders & Bosker, 1999). Comparison of the deviance of the hierarchical linear empty model and the full model shows, by means of a chi-square test, whether the inclusion of the explanatory variables provides a better fit to the data.

The hierarchical linear regression analyses were conducted on raw data scores. However, the distributions of the depression and anxiety symptom scores were skewed with the tail upwards (skewness= 1.198 and 1.794, respectively). To control for artificial effects all analyses were conducted on logarithmically transformed scores of depression and anxiety symptoms as well.

**Results**

Table 1 presents means and standard deviations of the different variables for males and females separately. Females report more depression and anxiety symptoms, as well as
problems in the communication with their parents. Males and females do not differ on perceived social support.

Pearson product-moment correlations were negative between perceived social support and depression symptoms ($r=-0.271$, $p<0.001$) and perceived social support and anxiety symptoms ($r=-0.103$, $p<0.05$). Problems in parent-offspring communication show a positive relation to symptoms, $r=0.313$ ($p<0.001$) for the association with depression symptoms and $r=0.172$ ($p<0.001$) with anxiety symptoms. Perceived social support and problems in parent-adolescent communication were negatively correlated ($r=-0.290$, $p<0.001$). The correlation between depression symptoms and anxiety symptoms was high ($r=0.621$, $p<0.001$).

Table 1 Means and standard deviations for males ($n=215$) and females ($n=287$)

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>$t$</th>
<th>$p$</th>
<th>Effect size $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression symptoms</td>
<td>21.69</td>
<td>24.57</td>
<td>-4.590</td>
<td>.000***</td>
<td>0.41</td>
</tr>
<tr>
<td>Anxiety symptoms</td>
<td>19.33</td>
<td>22.36</td>
<td>-6.282</td>
<td>.000***</td>
<td>0.55</td>
</tr>
<tr>
<td>Perceived social supporta</td>
<td>-.12</td>
<td>.09</td>
<td>-1.408</td>
<td>.160</td>
<td></td>
</tr>
<tr>
<td>Problems in parent-offspring communication</td>
<td>83.01 (13.64)</td>
<td>86.15 (15.77)</td>
<td>-2.335</td>
<td>.020*</td>
<td>0.21</td>
</tr>
</tbody>
</table>

*a Perceived social support-scores are the sum of standardized scores on the “number” and “satisfaction” scales;  
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Hierarchical linear regression analyses

Intra class correlations $\rho_{\text{LV}}$ in the hierarchical linear empty models of depressive and anxiety symptoms were 0.223 for depression and 0.179 for anxiety. Taking variance on the family level into account decreased deviance in depression symptoms significantly with 10.165 ($df=1$, $p<0.01$) from 3426.270 in the OLS empty model to 3416.105 in the hierarchical linear regression empty model. Deviance in anxiety symptomatology decreased significantly with 5.361 ($df=1$, $p<0.05$) from 3198.163 in the OLS empty model to 3192.802 in the hierarchical linear regression empty model. These results indicate that family membership explains variance in both depressive and anxiety symptoms and that it is necessary to take family membership into account when predicting individual symptoms.

Table 2 shows the results of the multivariate hierarchical regression analyses on depression and anxiety symptoms with gender, perceived social support, problems in parent-offspring communication, and their interactions as explanatory variables.
Regression analyses on the logarithmically transformed scores of depression and anxiety symptoms yielded the same results. The first order effects of gender, satisfaction with social support, problems in parent-offspring communication, and the three-way interaction between these variables were significant for depression symptoms. For anxiety symptoms, only the first order effects of gender and problems in parent-adolescent communication were significant. A first order effect represents the weighted average effect of the predictor coefficient across all observed values of the other predictors (Aiken & West, 1991, p.38).

Table 2 Hierarchical linear regression analyses on depression and anxiety symptoms

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depression symptoms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>21.883</td>
<td>.479</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gender</td>
<td>2.330</td>
<td>.623</td>
<td>.173</td>
<td>3.74</td>
<td>.000***</td>
</tr>
<tr>
<td>PSS</td>
<td>-1.371</td>
<td>.485</td>
<td>-.206</td>
<td>-2.83</td>
<td>.002**</td>
</tr>
<tr>
<td>PPAC</td>
<td>1.604</td>
<td>.527</td>
<td>.241</td>
<td>3.04</td>
<td>.001**</td>
</tr>
<tr>
<td>Gender × PSS</td>
<td>-0.204</td>
<td>.630</td>
<td>-.023</td>
<td>-0.32</td>
<td>.375</td>
</tr>
<tr>
<td>Gender × PPAC</td>
<td>0.227</td>
<td>.652</td>
<td>.027</td>
<td>0.35</td>
<td>.363</td>
</tr>
<tr>
<td>PSS × PPAC</td>
<td>0.156</td>
<td>.410</td>
<td>.026</td>
<td>0.38</td>
<td>.352</td>
</tr>
<tr>
<td>Gender × PSS × PPAC</td>
<td>-0.986</td>
<td>.546</td>
<td>-1.23</td>
<td>-1.81</td>
<td>.035*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Anxiety symptoms</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>19.518</td>
<td>.400</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gender</td>
<td>2.742</td>
<td>.522</td>
<td>.244</td>
<td>5.25</td>
<td>.000***</td>
</tr>
<tr>
<td>PSS</td>
<td>-0.330</td>
<td>.406</td>
<td>-.059</td>
<td>-0.81</td>
<td>.209</td>
</tr>
<tr>
<td>PPAC</td>
<td>0.838</td>
<td>.441</td>
<td>.151</td>
<td>1.90</td>
<td>.029*</td>
</tr>
<tr>
<td>Gender × PSS</td>
<td>-0.222</td>
<td>.529</td>
<td>-.030</td>
<td>-0.42</td>
<td>.337</td>
</tr>
<tr>
<td>Gender × PPAC</td>
<td>-0.254</td>
<td>.547</td>
<td>-.036</td>
<td>-0.46</td>
<td>.323</td>
</tr>
<tr>
<td>PSS × PPAC</td>
<td>0.346</td>
<td>.344</td>
<td>.068</td>
<td>1.01</td>
<td>.156</td>
</tr>
<tr>
<td>Gender × PSS × PPAC</td>
<td>-0.487</td>
<td>.459</td>
<td>-.073</td>
<td>-1.06</td>
<td>.145</td>
</tr>
</tbody>
</table>

PSS: Perceived Social Support; PPAC: Problems in Parent-Adolescent Communication; * $p<0.05$, ** $p<0.01$, *** $p<0.001$

With regard to depression symptomatology these results indicate that a) females experienced more symptoms than males, b) the more social support participants perceived, the less symptoms they reported, c) the more problems reported in parent-offspring communication, the more symptoms they reported, and d) the effect of perceived social support on depression symptoms differed for males and females when
the level of problems in parent-adolescent communication was taken into account. This complete model explained 17.5% of the variance in depression symptoms. Deviance decreased significantly by 92.402 (df=7, p<0.001) from 3416.105 in the hierarchical linear empty model to 3323.703 in the full model.

The results regarding anxiety symptoms indicate that there was no significant gender difference in the buffer-effect of social support. Only two first order effects were significant, indicating that a) more females than males experienced symptoms and b) the more problems in parent-offspring communication, the more symptoms they reported. This complete model explained 9.5% of the variance in anxiety symptoms. Deviance decreased significantly by 47.306 (df=7, p<0.001) from 3192.802 in the hierarchical linear empty model to 3145.496 in the full model. Removal of the three-way interaction and subsequently any of the two-way interactions did not change the findings except for the first order effect of support: when the interaction between gender and support was not entered into the model, the first order effect of support was significant.

Figure 1 Regression lines for the association between perceived social support and depression symptoms in males and females high and low on problems in parent-offspring communication

Figure 1 shows the regression lines for the effect of perceived social support (PSS) on depression symptoms in males and females in low and high conditions of problems in parent-offspring communication (PPAC). Since our model includes interactions, the regression lines were computed using the $B$ instead of the $\beta$ coefficients (Aiken & West, 1991, p.36). The values of 0 (male) and 1 (female) were used for gender. The values –1 and 1 (representing one standard deviation below and above the mean) were used for respectively the low and high conditions of perceived social support and problems in parent-offspring communication (Aiken & West, 1991, p.13). Figure 1 shows the three
first order effects as described above. The three-way interaction is such that the gender difference depression symptoms is larger for those participants reporting high stress and low support than the gender difference for those participants reporting high stress and high support.

Additional analyses

*Check on the effect of participants with current depression and anxiety disorders.* Our sample included 164 adolescents and young-adults with a lifetime diagnosis of depression and/or anxiety disorder according to DSM-IV. Fifty-nine participants reported an episode of depression and/or anxiety in the month preceding assessment. Being clinically depressed and/or anxious at the time of assessment may have systematically altered these participants’ experience of social support and problems in parent adolescent-communication, resulting in much stronger associations for these individuals than for the others and subsequently causing our results for depression symptoms to reach significance. To check whether our results replicate in a nonclinical/subclinical sample, we repeated our analyses with the participants (n=443; 207 males and 236 females) who did not have a current diagnosis. The results with regard to anxiety symptoms were the same as in the full sample. In this analysis, the complete model explains 7.4% of the variance in anxiety symptoms. For depression symptoms findings were similar as well: the three-way interaction remained significant \((t=-2.13, p=0.017)\), although the first order effect of gender just failed to reach significance \((t=1.63, p=0.052)\). The complete model explains 17.9% of the variance in depression symptoms in this analysis.

*Check on effects for problems in communication with father and mother separately.* The participants rated the communication with their father and mother separately, after which these scores were combined in a total score for problems in parent-offspring communication. However, adolescents and young-adults may be differentially affected by communication problems with father versus mother, and the effect of social support may differ accordingly. We repeated our analyses with the separate scores for fathers and mothers. Results for anxiety symptoms were similar, that is, no significant gender differences in the buffer effect of social support in relation to problems in father-offspring or mother-offspring communication. The full model including problems in father-offspring communication explained 9.2% of the variance in anxiety symptomatology, the model including problems in mother-offspring communication 8.8%. Results for depression symptoms, on the other hand, showed that the three-way interaction was
significant for father-offspring communication problems ($t=-1.78, p=0.038$), but not for problems in mother-offspring communication ($t=-1.12, p=0.131$). This difference could not be accounted for by differences in mean, variance or skewness between scores for father-offspring and mother-offspring communication. The full model including problems in father-offspring communication explained 18.1\% of the variance in depression symptoms, the model including problems in mother-offspring communication explained 14.4\%.

**Discussion**

In this study we argued that social support might serve as a protective factor in the development of depression and anxiety symptoms in offspring of parents suffering from depression and/or anxiety disorders. We assumed that problems in parent-offspring communication need not result in more symptoms when social support is sufficient. We argued further that this buffer-effect of social support is different for males and females, i.e. when scores on problems in parent-offspring communication are high, the difference between sons and daughters in number of symptoms is smaller in the condition where more support is perceived. Additionally, we assumed that this would hold for both depression and anxiety. We found a significant three-way interaction between gender, support, and stress; but only for depression symptoms. Our expectations are thus partly confirmed. However, certain limitations of our study must be considered.

A first limitation is that our data are cross-sectional. We argued that low perceived social support and problems in parent-offspring communication precede the development of depression and anxiety symptoms. We acknowledge that, since our data are cross-sectional, reciprocal causation between on the one hand perceived support and stress and on the other symptoms cannot be ruled out. Secondly, we relied on self-report data on all measures. Such a single-method approach is sensitive to reporting bias, which can inflate main effects, but it is difficult to see how this can produce a third order interaction effect. Finding the three-way interaction therefore supports the interpretation of our results. A possible third limitation is that our measures of social support and stress are conceptually and empirically related. Parents are important support providers for adolescents and young-adults to such an extent that parental support remains the best indicator of emotional problems in adolescence and young-adulthood (Helsen, Vollebergh, & Meeus, 2000). Therefore, problems in parent-offspring communication must influence the youngster’s perception of available support. On the other hand, in multivariate analyses the effects of the variables are adjusted for each other. To substantiate our findings,
replication is needed in a longitudinal or experimental design preferably using multiple informants, multiple methods, and measures that make a clearer distinction between social support and stress. Nonetheless, we found a significant three-way interaction between gender, stress and support, where others did not.

Our sample consisted of offspring of psychiatric patients of whom several already had developed clinical depression and anxiety. In line with Garber and Flynn (2001), we argued that the effect of social support is probably most salient in high-risk individuals. Mechanisms relevant to the development of depression and anxiety are more likely to surface in a high-risk sample, if only because high-risk samples offer more variation in risk factors and symptoms than normal population samples. More variation increases the likelihood of finding associations. However, it might alternatively be argued that the effect that we reported is merely caused by an overly negative state-dependent appraisal by our subgroup of clinically depressed or anxious participants (Robinson & Garber, 1995). In line with our argument regarding reporting bias, results were similar in our additional analysis from which those individuals who experienced a current episode were excluded.

Symptoms of the parental disorder may cause problems in the interaction between parent and child, but these problems are observed in adolescence and young adulthood in general as well (Collins, 1990; Jackson et al., 1998; Steinberg, 1990). Therefore, although sixty percent of the parents did not experience interference of psychiatric symptoms in their interpersonal relations in the year preceding assessment, the quality of parent-offspring communication is relevant to all our participants. Moreover, Garber and Flynn (2001) argued that interpersonal stressors such as interpersonal conflict are more likely to lead to depression than stressors of another nature. Given that it is additionally assumed that interpersonal stress has a larger impact on females, our focus on problems in parent-offspring communication may have contributed to finding a significant gender difference in the effect of perceived social support on stress. Interestingly, though, when the three-way analysis included problems in father-offspring and mother-offspring communication separately, the gender difference in the buffer-effect of social support only was significant in relation to problems in father-offspring communication. This finding is in line with the suggestion of Connell & Goodman (2002) that we should be aware of differential effects from mothers and fathers on offspring symptoms, not only concerning the effects of maternal versus paternal psychopathology, but also concerning quality of parent-offspring relationships. Unfortunately, we did not have large enough groups of offspring with only an affected father versus only an affected mother to conduct reliable analyses that account for the differential effects of paternal versus maternal psychopathology.

Depression and anxiety symptoms are not considered simultaneously very often. Some important work has been done on the specificity of stressful life-events and
circumstances (e.g., Brown, Harris, & Eales, 1996), but in general only depression is considered. Wade and Kendler (2000b) focused primarily on the relation between social support and depression as well, but did an additional analysis on generalised anxiety disorder. Contrary to our findings, they reported that the overall pattern for generalised anxiety disorder is similar to that for depression. In the present study we used measures of depression and anxiety symptomatology that differentiated as much as possible between the two types of problems. This resulted in an anxiety score based on symptoms of primarily Panic Disorder. We consider this scale to be a representation of the “core” elements of anxiety, without the elements that depression and anxiety often share, such as worrying or self-blame. In our opinion, the high correlation between the depression and anxiety scales is more likely to be a reflection of true comorbidity than of measurement inspecificity (Angold, Costello, & Erkanli, 1999; Hartman et al., 2001). Comorbidity of depression and anxiety complicates the efforts to find specific rather than generic risk and protective factors relevant to the development of depression and anxiety. Nevertheless, the present study shows that a first step to get a better insight in the relevance of individual factors is to study depression and anxiety simultaneously, using measures that differentiate between depression and anxiety as much as possible.

In conclusion, our results indicate that the gender difference in the buffer-effect of social support is evident in high-risk participants in relation to depression symptoms, when both the quantity and quality of perceived social support relations and interpersonal stress are considered. The effect of social support on anxiety symptoms was only significant as a first order effect; when the interaction with gender was entered the first order effect was no longer significant. This implies that social support as such is not relevant in relation to anxiety. Research should more often compare vulnerability models rather than individual risk factors. According to Garber and Flynn (2001) the relevance of individual factors can only be established in more complex moderator and mediation models that explore how factors work together in the development of different disorders. The present findings illustrate the importance of considering both the reciprocal relations between etiological factors and multiple disorders.