Intergenerational relations in childhood anxiety: a network approach

Baartmans, J.M.D.; Steensel, B.F.J.A. van; Kossakowski, J.J.; Klein, A.M.; Bögels, S.M.

Scandinavian Journal of Psychology, 2023 DOI: 10.1111/sjop.12983

Empirical Article

Intergenerational relations in childhood anxiety: A network approach

JEANINE M. D. BAARTMANS,[1,2] BONNY F. J. A.VAN STEENSEL,[3] JOLANDA J. KOSSAKOWSKI,[4] ANKE M. KLEIN[2,5] and SUSAN M. BÖGELS[3]

[1]*UvA Minds, Academic Treatment Centre, Amsterdam, The Netherlands*
[2]*Developmental Psychology, University of Amsterdam, Amsterdam, The Netherlands*
[3]*Child Development and Education, University of Amsterdam, Amsterdam, The Netherlands*
[4]*Psychological Methods, University of Amsterdam, Amsterdam, The Netherlands*
[5]*Developmental and Educational Psychology, Leiden University, Leiden, The Netherlands*

Baartmans, J. M. D., van Steensel, B. F. J. A., Kossakowski, J. J., Klein, A. M. & Bögels, S. M. (2023). Intergenerational relations in childhood anxiety: A network approach. *Scandinavian Journal of Psychology.*

Objective
Family factors are assumed to play a central role in the development of childhood anxiety disorders. How child and parental anxiety symptoms are intertwined on a symptom and family level has not yet been examined. Such knowledge may lead to a more detailed understanding of the intergenerational relation in anxiety problems. The current study investigated the relation between anxiety in children and their parents at a symptom level using a network approach.

Method
Parents of 1,452 clinically referred children in the Netherlands completed questionnaires on anxiety about their children and themselves. We examined relations on a symptom level both within persons and between parents and children. In addition, we also compared the relations between parental and child anxiety symptoms in families with children with an anxiety disorder (n = 350) versus families with children who displayed other psychiatric diagnoses (n = 1,102).

Results
Anxiety symptom relations within persons were more intertwined than the symptom relations between family members. Between-person relations were found among similar anxiety symptoms, suggesting specific intergenerational relations. The feeling of being fearful was found to be a central and connecting symptom in all family members (fathers, mothers, and children). The relations between parental and child anxiety symptoms were more specific (i.e., among similar symptoms) in families with children with an anxiety disorder than in families with children with other types of psychopathologies.

Conclusions
This study found that anxiety symptom associations are present within the family on a detailed (symptom) level. This stresses the importance of future studies to examine factors responsible for this family-anxiety transmission.

Key words: Children, anxiety, family factors, network analysis, intergenerational relation.

Jeanine M. D. Baartmans, UvA Minds, Academic Treatment Centre, The Netherlands. E-mail: jeanine.baartmans@gmail.com

Anxiety disorders are among the most common psychological disorders in children, with an estimated point prevalence of 6.5% for any anxiety disorder (Polanczyk, Salum, Sugaya, Caye & Rohde, 2015). Anxiety disorders are characterized by excessive fear and related emotional-behavioral disturbances that interfere with daily functioning (American Psychiatric Association, 2013). Childhood anxiety disorders are associated with school dropout, increased risk of later depression, and substance abuse and with high societal costs (Bodden, Dirksen & Bögels, 2008; Keller, 1992). There is a large overlap between anxiety disorders in family members (Beidel & Turner, 1997; Biederman, Rosenbaum, Bolduc, Faraone & Hirshfeld, 1991; Nauta, Scholing, Emmelkamp & Minderaa, 2003; Shimada-Sugimoto, Otowa & Hettema, 2015), and children with an anxiety disorder are two to three times more likely to have at least one parent who meets the criteria for a current or lifetime anxiety disorder diagnosis when compared with control children (Telman, van Steensel, Maric & Bögels, 2018). In addition, there is ample evidence linking parent factors to childhood anxiety (Bögels & Brechman-Toussaint, 2006; McLeod, Wood & Weisz, 2007; Rapee, Schniering & Hudson, 2009; van der Bruggen, Stams & Bögels, 2008; Wood, McLeod, Sigman, Hwang & Chu, 2003). It has therefore been hypothesized that involving parents in the treatment of their children would improve the efficacy of treatment for childhood anxiety. Strangely enough, however, multiple studies examining the involvement of parents in childhood cognitive behavioral therapy showed no improved outcomes or even reverse relations between parental involvement and treatment outcomes (Creswell & Cartwright-Hatton, 2007; In-Albon & Schneider, 2007; Öst & Ollendick, 2017; Rapee, Schniering & Hudson, 2009). Therefore, the current study aimed to get more insight into the basic characteristics of child anxiety symptoms and their reciprocal relationship with parental anxiety symptoms to obtain a better understanding of the intergenerational relations to anxiety in a clinical sample.

Several studies that focused on the intergenerational transmission of psychopathology found that having a parent with a disorder is related to a heightened chance of a variety of disorders in the offspring. The relation between parental and child psychopathology seems more specific for anxiety disorders, but it

is not clear why this relation is more specific for these disorders (Leijdesdorff, van Doesum, Popma, Klaassen & van Amelsvoort, 2017). What we do know is that genetic factors as well as family (parental) factors play a role in the development of childhood anxiety disorders. That is, the heritability of sensitivity for anxiety problems is around 45% (Shimada-Sugimoto, Otowa & Hettema, 2015; Stein, Jang & Livesley, 1999), and various family variables (attachment, family dysfunction, parenting style, parental beliefs, anxious modeling, and parental support) have been linked to childhood anxiety. First, studies indicate that insecure attachment in parents and children is associated with child anxiety (Colonnesi, Draijer, Stams, van der Bruggen, Bögels & Noom, 2011). Additionally, there is some preliminary evidence that attachment predicts childhood anxiety disorders and that improving the parent–child attachment relationship may help to treat childhood anxiety disorders. Second, family dysfunction, for instance low family cohesiveness and adaptability or dysfunctional interactive processes among family members, is associated with parents' and children's anxiety symptoms (Rapee, 2012). Third, there is considerable evidence for a relation between parenting styles and child anxiety (McLeod, Wood & Weisz, 2007; van der Bruggen, Stams & Bögels, 2008). Parents can transfer anxiety to their children by their parenting style, for example when they act overprotective in their parenting or force their children to encounter anxious situations (McLeod, Wood & Weisz, 2007). Also, higher levels of negativity in parents might provoke anxiety (Krohne, 1990, 1992; Rapee, 2012). Fourth, the beliefs that parents hold about their children's anxious thoughts and behaviors, and parental beliefs on their own control, are found to be associated with parents' and children's anxiety symptoms (Bögels & Brechman-Toussaint, 2006). Fifth, children may copy anxious behavior from their parents and perceive or interpret situations as threatening (Muris, Steerneman, Merckelbach & Meesters, 1996; Muris, Merckelbach, de Jong & Ollendick, 2002; van Niekerk, Klein, Allart-van Dam *et al.*, 2018; for a meta-analysis, see Stuijfzand, Creswell, Field, Pearcey & Dodd, 2018). Finally, if parents suffer from an anxiety disorder, they might be less available for supporting their children (Biringen & Easterbrooks, 2012a, 2012b), which may lead to their children being more likely to develop anxiety problems as they feel less safe (Ainsworth, Blehan, Waters & Wall, 2015; Kerns & Brumariu, 2014).

Even though parental anxiety and child anxiety are associated and are influenced by different factors, the role of gender is much less clear. That is, most studies focusing on the transmission of anxiety examined only mothers and their children and did not include fathers. One argument for including both fathers and mothers in the transmission of anxiety is that different dimensions of parental anxiety in fathers and mothers are linked to parenting behaviors, and these behaviors are again differentially associated with children's anxiety (Möller, Majdandžić & Bögels, 2015). For example, in a meta-analysis by Möller, Nikolić, Majdandžić, and Bögels (2016), it was concluded that fathers' parenting is at least as important as mothers' parenting, and that the fathers' challenging behavior seems even more important than mothers' challenging behavior. It has also been argued that especially fathers might influence their children more in a threatening environment, since fathers have a stronger role in external protection in human evolution (Bögels & Perotti, 2011; Bögels & Phares, 2008). Moreover, another study by Bögels, Bamelis, and van der Bruggen (2008) found that fathers who were more anxious were more controlling over their anxious child, while mothers' anxiety status was related to different rearing behaviors. In addition, parental overprotection seems to have a different role in the relation between father–child anxiety than in the relation between mother–child anxiety (Bögels & van Melick, 2004; Verhoeven, Bögels & van der Bruggen, 2012). Therefore, it is important to study the role of both maternal and paternal factors in child anxiety. In addition, several studies indicated that the agreement between the ratings of fathers and mothers of their child's anxiety was (only) moderate, and that both parents were equally effective in their ratings (Mascendaro, Herman & Webster-Stratton, 2012; Moreno, Silverman, Saavedra & Phares, 2008). It is therefore encouraged to include both mothers' and fathers' ratings of their child's anxiety.

In addition to studying the relation between parental anxiety and childhood anxiety, and to include *both* parents, it may also be important to pay attention to the role of anxiety in partner relations and child-rearing behavior. In contrast to other types of psychopathologies, results have been mixed on partner concordance for anxiety disorders (Low, Cui & Merikangas, 2007). That is, even though individuals have the tendency to select partners with similar temperamental and personality traits, there is no clear evidence that individuals with anxiety disorders more often have partners with anxiety disorders (Dubuis-Stadelmann, Fenton, Ferrero & Preisig, 2001; Low, Cui & Merikangas, 2007). Nevertheless, small correlations at a symptom level were found (van Grootheest, van den Berg, Cath, Willemsen & Boomsma, 2008). In addition, studies showed that fathers of children with an anxiety disorder were less supportive in the relationship with their partner (Bögels, Bamelis & van der Bruggen, 2008), and interparental conflicts and separation have been identified as risk factors for the increase of anxiety problems in families (Rapee, 2012). Thus, studying the relation between parental and child anxiety symptoms while also taking the relation between parents into account could provide useful information on how and to what extent anxiety symptoms within families are entangled.

The current study aimed to better understand the overlap between anxiety in parents and their children by investigating the relations among anxiety symptoms within and between family members (children, mothers, fathers) on a symptom level using a network approach. More specifically, our study had three goals. First, we examined the connection between anxiety symptoms in children and parents, and how fathers' and mothers' anxiety symptoms were related to their children's anxiety symptoms. We examined this by studying the between-person connections between anxiety symptoms in parents and their children. Second, we examined which anxiety symptoms played an important (central) role in each person's (child's, mother's, father's) anxiety problems, and whether this was similar for children, mothers, and fathers. Finally, our third goal was to study possible differences in the relation between children's and parent's anxiety symptoms for children with an anxiety disorder versus children without an anxiety disorder (but with other clinical diagnoses) to test if intergenerational

relations are more specific for children with an anxiety disorder than for children with other disorders.

METHODS

Participants

A total of 1,452 parents of children who were referred to an academic treatment center connected to [the University of Amsterdam] for mental health care problems participated in the current study. All children were between 6 and 18 years old (M = 10.86, SD = 2.94; 64.6% boys). In total, 1,411 (97.2%) mothers and 1,134 (78.1%) fathers completed the measures. The average age of the mothers was 44.36 years (SD = 5.54), and the average age of the fathers was 46.81 years (SD = 6.09). Descriptive information on the primary diagnosis of the children and the presence of (other) diagnoses is presented in Table 1, and further descriptive information about the families is presented in Table 2. All children had at least one diagnosis, and 27.6% (n = 401) of the children had more than one diagnosis. Table 3 displays the type of anxiety disorders for the group of children with an anxiety disorder (n = 350). Approximately half of the children with an anxiety disorder (n = 179, 51.1%) had at least one comorbid diagnosis (14.0%, n = 49, had more than one anxiety diagnosis). In the group of children without an anxiety disorder (n = 1,102), 20.1% (n = 222) of the children had at least one comorbid diagnosis.

Measures

Child Behavior Checklist 6–18 (CBCL/6–18). The CBCL/6–18 is a questionnaire for parents to investigate problem behavior in their children and includes 113 items. Parents are asked to indicate how much the statements would have applied to their child over the past 6 months on a three-point scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). The CBCL has good internal consistency (Achenbach, Becker, Döpfner *et al*., 2008). Internal consistency for the CBCL total score was excellent in the current study (mothers: α = 0.94; fathers: α = 0.94), with mothers reporting clinical total scores for 44.0% of the children and subclinical scores for 17.5% of the children (t scores: M = 62.64, SD = 8.43, range = 25–86). Fathers reported clinical total scores for 34.5% of the children and subclinical scores for 15.4% of the children (t scores: M = 59.95, SD = 9.05, range = 31–79).

Table 1. *Primary diagnosis (based on DSM-IV-TR) of the children and the presence of diagnoses (including the primary diagnosis) in the children as determined by clinicians*

	n	%
Primary diagnosis		
Attention deficit and hyperactivity disorder	623	42.9
Autism spectrum disorder	226	15.6
Anxiety disorder	215	14.8
Posttraumatic stress disorder	93	6.4
Disorder in infancy	64	4.4
Mood disorder	56	3.9
Obsessive compulsive disorder	52	3.6
Behavioral disorder	37	2.5
Other diagnosis	46	3.2
No diagnosis	40	2.8
Total	1,452	100.0
Presence of diagnosis in the profile		
Attention deficit and hyperactivity disorder	658	45.3
Anxiety disorder	350	24.1
Autism spectrum disorder	226	15.6
Adjustment disorder	186	12.8
Posttraumatic stress disorder	128	8.8
Obsessive compulsive disorder	86	5.9
Mood disorder	81	5.6
Behavioral disorder	59	4.1

Table 2. *Descriptive information as reported by the parents*

			Mothers		Fathers	
	N	%	*N*	%	*N*	%
Living situation of the child						
With both parents	950	65.4				
(Mainly) with mother	247	17.0				
(Mainly) with father	10	0.7				
(Mainly) with mother and new partner	41	2.8				
(Mainly) with father and new partner	5	3.4				
Co-parenting	175	12.1				
Other	4	0.3				
(Missing information)	20	1.3				
Number of siblings						
None	248	17.1				
One	703	48.4				
Two	344	23.7				
Three	88	6.1				
Four or more	49	3.4				
(Missing information)	20	1.4				
Parents' relation to the child						
Biological parent			1,356	96.1	1,078	95.1
Adoptive parent			7	5.0	15	1.3
Stepparent			4	2.8	9	0.8
Foster parent			10	7.1	2	1.8
Other			13	9.2	7	6.1
(Missing information)			21	1.5	23	2.0
Parent's highest completed level of education						
University			487	34.5	440	38.8
Applied university			481	34.1	281	24.8
Community college			173	12.3	141	12.4
Secondary school			195	13.8	190	16.8
Primary school			12	0.9	13	1.1
Other			36	2.6	38	3.4
(Missing information)			27	1.9	31	2.7

Note: The living situation and the number of siblings of the children are a percentage of the total number of children, the mother's relation to the child and mothers' highest level of completed education is a percentage of the total participating mothers, and the father's relation to the child and fathers' highest level of completed education is a percentage of the total participating fathers.

Table 3. *Type of anxiety disorder in the group of children with an anxiety diagnosis as determined by the clinicians (based on DSM-IV-TR)*

Anxiety disorder	*N*	%
Generalized anxiety disorder	119	34.0
Social anxiety disorder	110	31.4
Specific phobia	77	22.0
Separation anxiety disorder	44	12.6
Panic disorder and/or agoraphobia	12	3.4
Selective mutism	5	1.4
Hypochondria	4	1.1
Not otherwise specified	42	12.0

In the current study, only the DSM-anxiety scale of the CBCL was used. This scale consists of the following items: "clings to adults or too dependent," "fears certain animals, situations, or places, other than school," "fears going to school," "nervous, high strung, or tense," "too fearful or anxious," and "worries," and has an acceptable internal consistency (α = 0.79; Nakamura, Ebesutani, Bernstein & Chorpita, 2009). The internal consistency of the DSM-anxiety scale of the CBCL in the current sample was also acceptable (mothers: α = 0.75; fathers: α = 0.74). Mothers reported clinical scores on the anxiety scale for 18.0% of the children and subclinical scores for 19.0% of the children (*t* scores: *M* = 61.60, *SD* = 8.60, range = 50–80). Fathers reported clinical scores on the anxiety scale for 15.3% of the children and subclinical scores for 13.9% of the children (*t* scores: *M* = 59.96, *SD* = 8.37, range = 50–79).

Adult Self-Report (ASR). The ASR is a 126-item questionnaire to measure problem behavior in adults during the past 6 months. Parents had to indicate for each item how much the statements applied to them on a three-point scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). The ASR has good test–retest reliability and good internal consistency (Achenbach, Becker, Döpfner *et al.*, 2008). The internal consistency of the ASR in the current study was excellent (mothers: α = 0.94; fathers: α = 0.94). Of the mothers, 6.0% had a clinical total score on the ASR and 5.6% had a subclinical total score (*t* scores: *M* = 48.11, *SD* = 10.51, range = 25–92). Of the fathers, 4.3% had a clinical score on the ASR and 5.2% a subclinical score (*t* scores: *M* = 47.06, *SD* = 10.85, range = 26–87).

The DSM-anxiety scale consisting of seven items of the ASR was used for the analysis in the current study. The items of the scale are "I worry about my future," "I am afraid of certain animals, situations, or places," "I am nervous or tense," "I am too fearful or anxious," "Heart pounding or racing," "I worry about my family," and "I worry a lot." The DSM-anxiety scale of the ASR has good reliability (α = 0.86; Achenbach, Newhouse & Rescorla, 2004). The internal consistency of this scale in the current sample was acceptable (mothers: α = 0.75; fathers: α = 0.76). Of the mothers, 0.9% had a clinical score and 4.3% had a subclinical score on the anxiety subscale (*t* scores: *M* = 53.39, *SD* = 5.13, range = 50–80). Of the fathers, 0.5% had a clinical score and 2.9% had a subclinical score on the anxiety subscale (*t* scores: *M* = 52.82, *SD* = 5.06, range = 50–80).

Procedure

All participants in the study were parents of children who were seeking treatment in specialized mental health care in [the Netherlands]. The measures that were used in the current study were part of the screening information that parents completed about their children and themselves before the diagnostic process and/or treatment started. All questionnaires were sent digitally to the parents, who were asked to complete them before their first visit to the clinic. The diagnoses were determined by the multidisciplinary team of the mental health care center and were based on (school) observations, questionnaires, structured clinical interviews, psychiatric evaluations, and/or neuropsychological assessments. An inclusion criterion for referral to the academic treatment center was that children's cognitive functioning was minimally at a below-average level (i.e., IQ > 70) as indicated by their school performance. Families' informed consent was obtained. Ethical approval for the study was provided by the ethical committee of the [removed for blinded review]. Data were collected between July 2010 and January 2019. Data of 166 children were removed due to missing consent for research. In addition, 205 cases were removed because they filled in the questionnaires multiple times, as they had received treatment before in the same center during the data collection. The first assessment was used in these cases. All analyses and descriptive statistics were conducted after removal of these cases.

Data analysis

A network approach was used to analyze the data. A network is a graphic representation of correlations. This approach is used to study relations between psychopathology symptoms within persons for understanding comorbidity between disorders (e.g. Borsboom, Cramer, Schmittmann, Epskamp & Waldorp, 2011). In the current study, the approach was used to investigate the relations both within and between persons; i.e., fathers' and mothers' reports on their own anxiety symptoms and their reports on their children's anxiety symptoms were analyzed in one network. The nodes represent the symptoms, and the lines between the nodes represent the significant partial correlations, controlling for all other symptoms. Symptoms that are closely related to each other (with multiple reciprocal relations) are also visualized closely to each other in the network. In addition, thicker lines between symptoms correspond with stronger relations (Epskamp, Cramer, Waldorp, Schmittmann & Borsboom, 2012).

We used centrality indices to identify the anxiety symptom(s) that played a central role among all anxiety symptoms and visualized them. We calculated three different centrality measures, namely strength, closeness, and betweenness. A symptom is central, important, and influential when it has many connections (strength), is close to other symptoms (closeness), and connects to other symptoms (betweenness; Epskamp, Cramer, Waldorp, Schmittmann & Borsboom, 2012). We also performed a bootstrapping procedure with 1,000 bootstraps to assess the stability of the centrality measures and the edge weights. Both the bootstraps of the edge weights and the bootstraps of the centrality measures were visually inspected, followed by an evaluation of the correlation stability coefficients (CS-coefficients). The CS-coefficient gives information about the proportion of data that could be dropped while keeping at least a 0.7 correlation with the original centrality estimates (Epskamp, Borsboom & Fried, 2018). CS-coefficients should ideally be greater than 0.5, and not lower than 0.25.

In the next step, we aimed to test if the relations between parent's and children's anxiety symptoms significantly differed for the group of children with an anxiety disorder (Anxiety group) and the group without an anxiety disorder but with other types of psychopathologies (Other group). First, to make a comparison between these groups, we drew a random sample from the group of children without an anxiety disorder with a sample size equal to the group of children with an anxiety disorder. Next, we generated two networks on the full dataset, one for the relation between mothers' anxiety symptoms and children's anxiety symptoms as reported by mothers and one for the relation between fathers' anxiety symptoms and children's anxiety symptoms as reported by fathers. We compared the networks of the two groups separately for the relation between mothers and children and for fathers and children because of the (relatively small) sample size of the anxiety group. Subsequently, four networks were generated by fitting the data of the Anxiety group and the random sample of the Other group on the layout of the original network separately for the mother–child anxiety relation and for the father–child anxiety relation. We compared the mother–child anxiety relation network for the Anxiety and the Other group by using a stepwise approach as described by van Borkulo, Boschloo, Kossakowski, and Tio (2017). The first step consisted of a visual comparison between the networks. In the second step, we computed the correlation between the edge weights of the two models. The third step was a test on network structure invariance with a network comparison test (NCT). The NCT is a permutation-based hypothesis test. Significant results of this test correspond with differences in relations between these networks. Since we were specifically interested in the intergenerational relations, we decided to investigate if these relations differed between the two groups regardless of whether the relation differed overall between the networks. This stepwise approach was repeated for comparing the networks for the father–child anxiety relations between the two groups.

All networks were estimated using the Bootnet package in R (version 1.3; Epskamp, Borsboom & Fried, 2018). The NCT package was used as a test on network structure invariance (version 2.2.1; van Borkulo, Boschloo, Kossakowski & Tio, 2017).

RESULTS

Full network

Figure 1 presents the full network of the anxiety symptoms in fathers, mothers, and their children (see Table S1 for edge weights

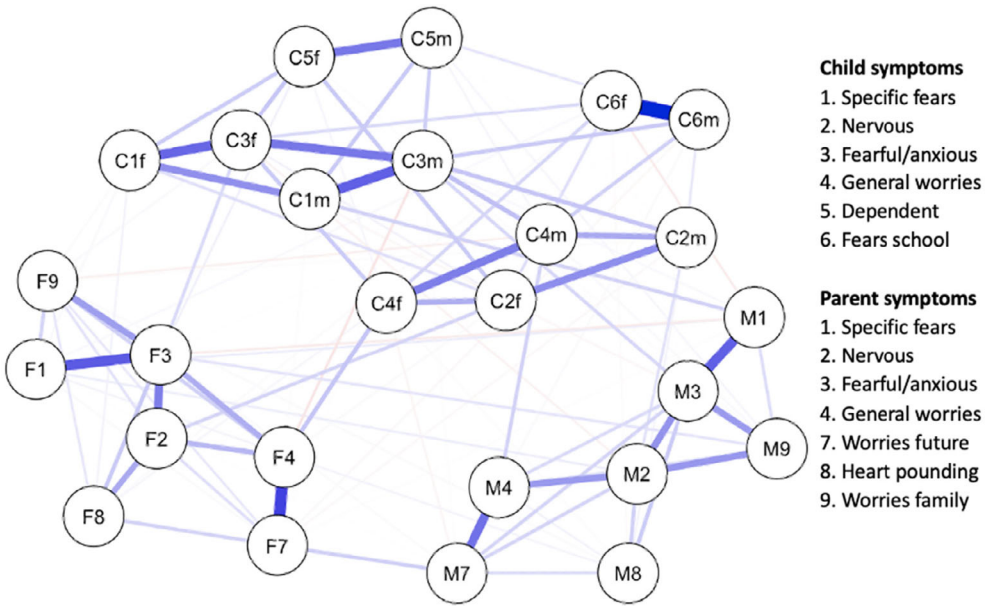

Fig. 1. Full network with the relations between fathers', mothers', and children's anxiety symptoms as reported by fathers and mothers. *Note*: Symptoms starting with *M* are mothers' own anxiety symptoms and symptoms starting with *F* are fathers' own anxiety symptoms. Children's symptoms start with *C* and where they end with *m* the symptoms are reported by the mothers while where they end with *f* the symptoms are reported by the fathers. The thickness of the lines corresponds with the strength of the relations between the symptoms. Purple lines are positive relations and red lines are negative relations.

of the full model and Fig. S1 for the plots of the bootstrapping procedure). The network showed a pattern of three rather separate clusters: symptoms of each family member were more closely related to each other than the symptoms between family members. In addition, there were more and stronger relations within family members (ticker lines) than between family members (thinner lines). In the next paragraph, the results between and within family members are discussed in more detail.

The results of the stability analyses suggested that the stability of the edge weights and centrality measures were acceptable to good. The CS-coefficients showed that the stability of betweenness ($CS = 0.36$) was acceptable, the stability of closeness ($CS = 0.44$) was acceptable to good, and the stability of strength ($CS = 0.75$) was excellent.

Between-person relations

Confidence intervals that were generated by the bootstrapping procedure showed that there were 10 significant between-person relations. In total, we found four significant relations between maternal and child anxiety symptoms, three between paternal and child symptoms, and three between maternal and paternal anxiety (see Table 4). The significant correlations between the different family members were all for the same symptoms, except for the negative relation between maternal specific fears and father's fearfulness or anxiousness. Furthermore, the significant relations between parental and child anxiety symptoms were all between the same informants.

Within-person relations

All significant within-person correlations for father anxiety symptoms, mother anxiety symptoms, child father-reported symptoms, and child mother-reported symptoms are presented in Figs 2 through 4. Figure 5 includes a centrality plot of the anxiety symptoms in fathers, mothers, and children. Based on the betweenness, closeness, and strength and the within-person networks, the symptom "fearful/anxious" (M3, F3, C3m, and C3f)

Table 4. *Significant relations between the family members based on the confidence intervals of the non-parametric bootstrapping procedure*

Mother		Father		Child – mother reported		Child – father reported		
Node	Description	Node	Description	Node	Description	Node	Description	Edge weights
		F4	General worries			C4f	General worries	0.139
M9	Worries future	F7	Worries future					0.115
M4	General worries			C4m	General worries			0.108
M1	Specific fears			C1m	Specific fears			0.107
		F2	Nervous			C2f	Nervous	0.101
M3	Fearful/anxious			C3m	Fearful/anxious			0.094
		F3	Fearful/anxious			C3f	Fearful/anxious	0.088
M2	Nervous			C2m	Nervous			0.071
M1	Specific fears	F3	Fearful/anxious					−0.046
M1	Specific fears	F1	Specific fears					0.043

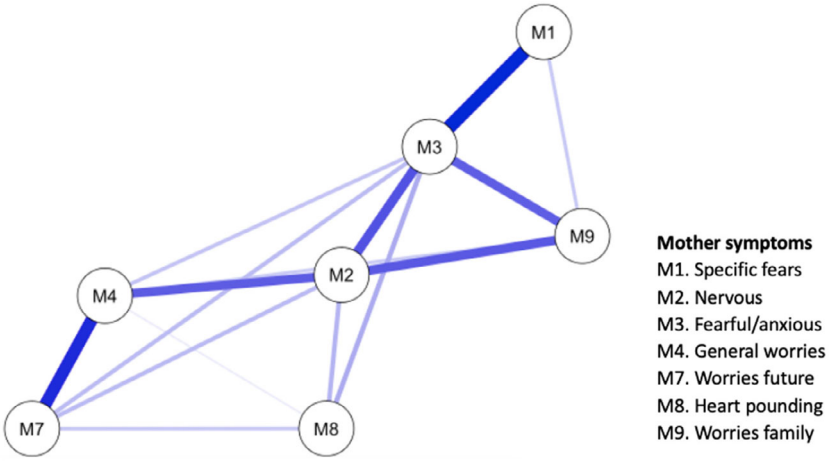

Fig. 2. Maternal anxiety symptoms network.*Note*: The thickness of the lines corresponds with the strength of the relations between the symptoms.

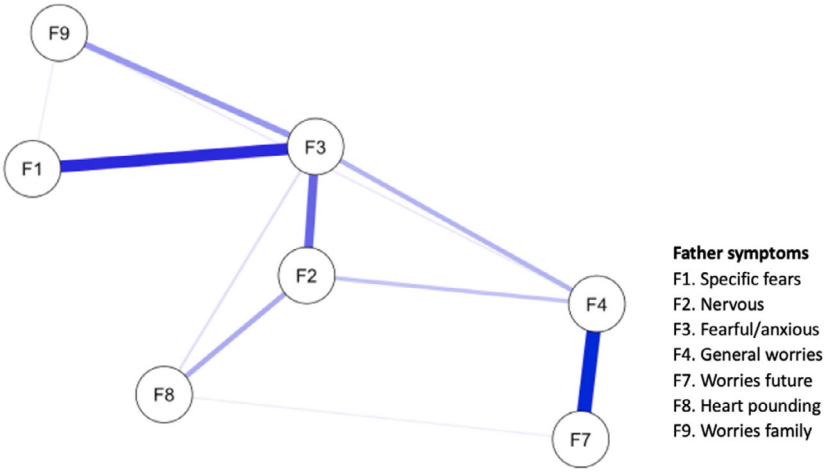

Fig. 3. Paternal anxiety symptoms network.*Note*: The thickness of the lines corresponds with the strength of the relations between the symptoms.

played a central role in all family members. These nodes showed close and strong connections with other symptoms and connected other nodes with each other.

Comparison between groups

The networks of the relations between fathers', mothers', and children's anxiety symptoms for the Anxiety group and the Other group[1] are presented in Figs. 6 and 7 (see Tables S2 and S3 for edge weights of the group models). The CS-coefficients of these four networks suggest that the results should be interpreted with caution (Table 5).

A visual inspection of Figs. 6 and 7 suggests more relations between parental anxiety symptoms and child anxiety symptoms in the Other group than in the Anxiety group. However, the relations in the Other group were both negative and positive, while they were only positive in the Anxiety group. Therefore, the relations between maternal and paternal anxiety symptoms and child anxiety symptoms in the Anxiety group seemed to be more specific (i.e., there were mainly positive relations between similar symptoms in children and parents) than in the Other group.

The correlation between the edge weights of the network with mother and child anxiety symptoms in the Anxiety group and in the Other group was 0.77. The correlation between the edge weights of the network with father and child anxiety symptoms in the Anxiety group and the Other group was 0.63. The network comparison test between the mother–child network in the Anxiety group and the Other group revealed that the networks, $p = 0.42$, and the strength of the networks (Anxiety: strength = 4.80; Other: strength = 7.10), $p = 0.14$, did not differ significantly from each other. The network comparison test between the father–child network in the Anxiety group and the Other group revealed that the networks, $p = 0.3$, and the strength of the networks (Anxiety: strength = 5.08; Other: strength = 7.80), $p = 0.23$, also did not differ significantly from each other.

A further inspection of the between-person relations revealed that six of the 42 relations (marginally) significantly ($\alpha = 0.05$; $\alpha = 0.10$) differed in edge weights between the Anxiety and Other groups for the mother–child anxiety symptom relations. In total, three of the 42 father–child anxiety symptom relations were significantly different (Table 6). These relations were all present in the Other group and not in the Anxiety group or were stronger in the Other group than in the Anxiety group.

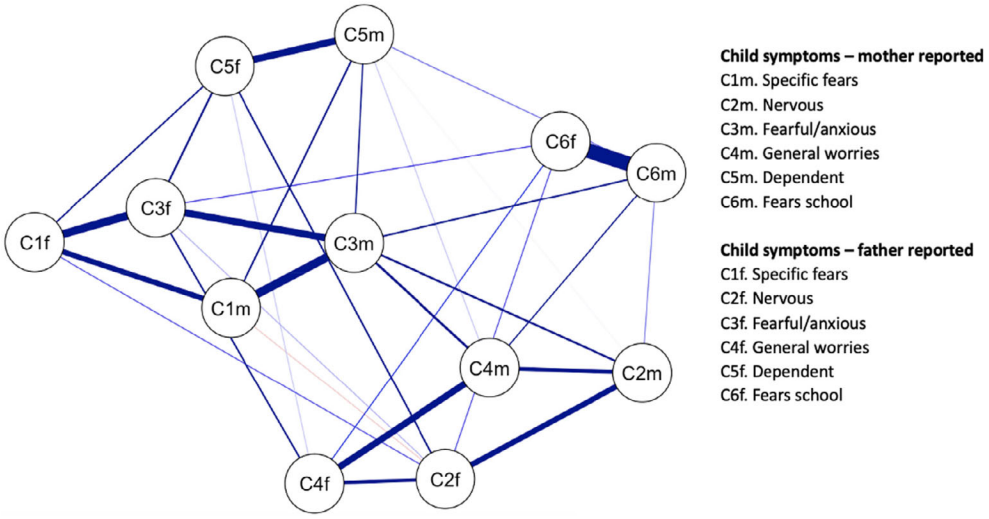

Fig. 4. Child anxiety symptoms network reported by fathers and mothers.*Note*: The thickness of the lines corresponds with the strength of the relations between the symptoms. Purple lines are positive relations and the red line is a negative relation.

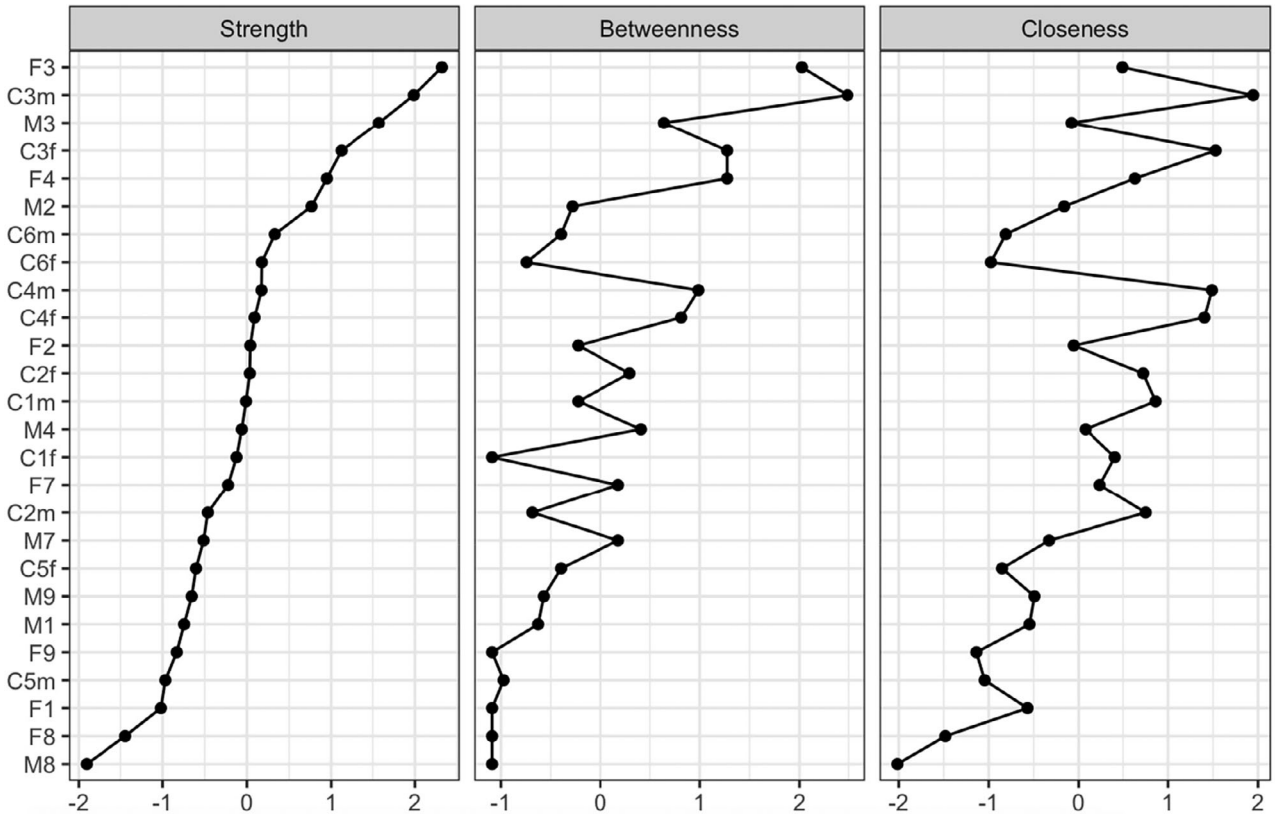

Fig. 5. Centrality plot of the networks with all anxiety symptoms in fathers, mothers, and their children sorted on strength of the nodes.*Note*: M1 = mother specific fears, M2 = mother nervous, M3 = mother fearful/anxious, M4 = mother general worries, M7 = mother worries future, M8 = mother heart pounding, M9 = mother worries family, F1 = father specific fears, F2 = father nervous, F3 = father fearful/anxious, F4 = father general worries, F7 = father worries future, F8 = father heart pounding, F9 = father worries family, C1m = mother reported child specific fears, C2m = mother reported child nervous, C3m = mother reported child fearful/anxious, C4m = mother reported child general worries, C5m = mother reported child dependent, C6m = mother reported child fears school, C1f = father reported specific fears, C2f = father reported child nervous, C3f = father reported child fearful/anxious, C4f = father reported child general worries, C5f = father reported child dependent, C6f = father reported child fears school.

DISCUSSION

The aim of the current study was to investigate the relation between anxiety symptoms in children and their parents. More specifically, we aimed to study (1) the connections between children's and parents' anxiety symptoms, (2) the importance/centrality of anxiety symptoms within the different family

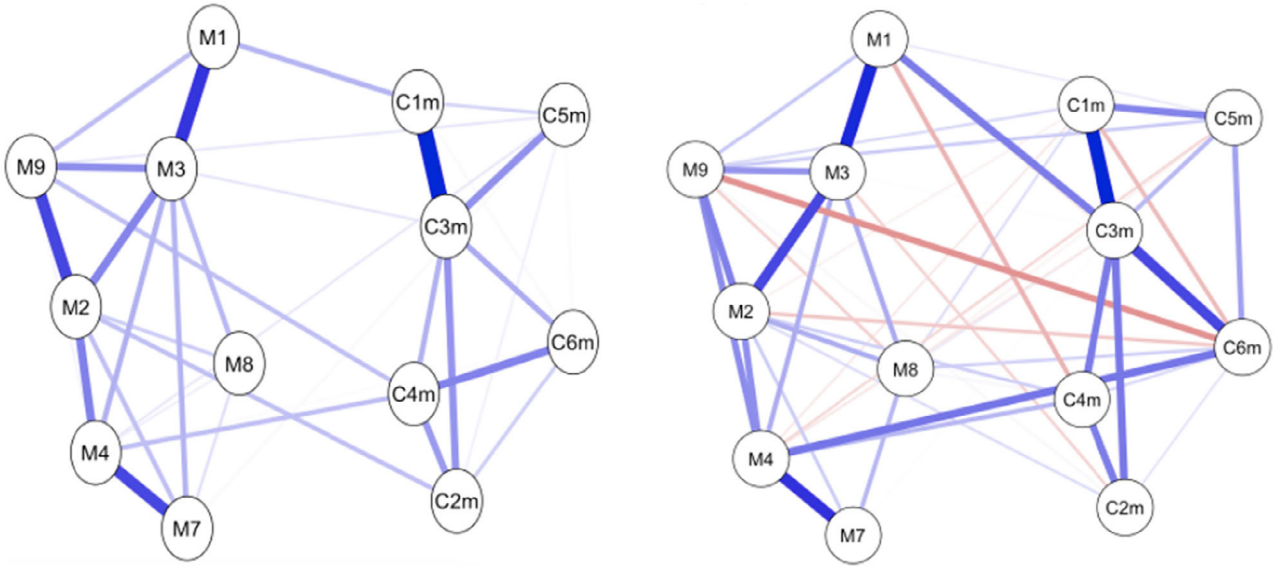

Fig. 6. Relation between maternal and mother-reported child anxiety symptoms in the Anxiety group (left) and Other group (right).*Note*: The lines are indicators of relative edge strengths within the networks. Purple lines indicate positive relations and red lines indicate negative relations. M1 = mother specific fears, M2 = mother nervous, M3 = mother fearful/anxious, M4 = mother general worries, M7 = mother worries future, M8 = mother heart pounding, M9 = mother worries family, C1m = mother reported child specific fears, C2m = mother reported child nervous, C3m = mother reported child fearful/anxious, C4m = mother reported child general worries, C5m = mother reported child dependent, C6m = mother reported child fears school. The thickness of the lines corresponds with the strength of the relations between the symptoms. Purple lines are positive relations and red lines are negative relations.

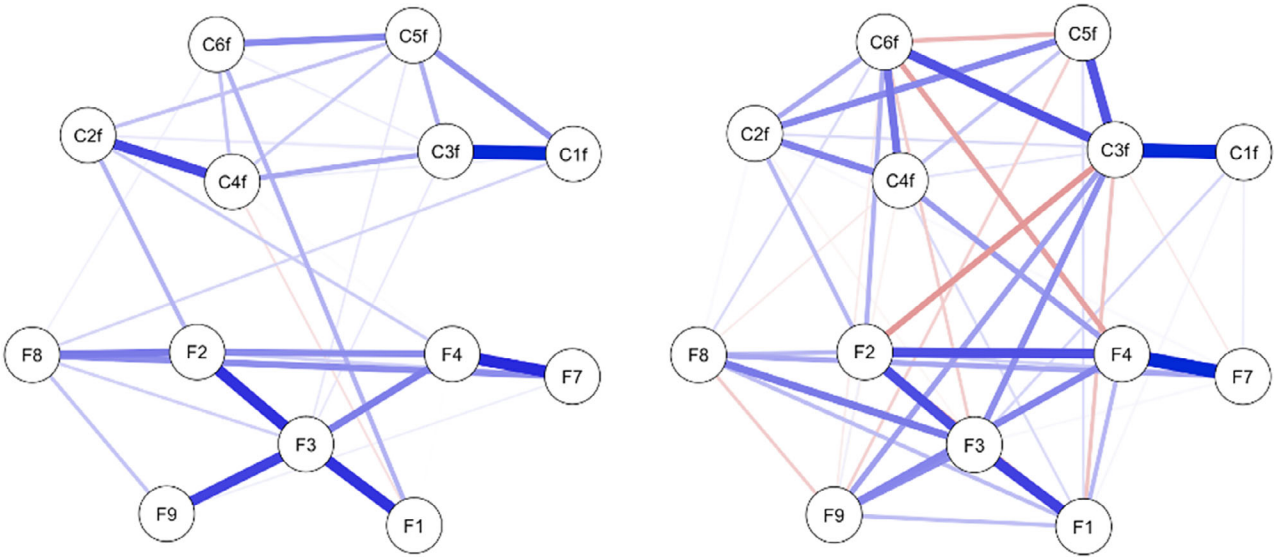

Fig. 7. Relation between paternal and father-reported child anxiety symptoms in the Anxiety group (left) and Other group (right).*Note*: The lines are indicators of relative edge strengths within the networks. Purple lines indicate positive relations and red lines indicate negative relations. F1 = father specific fears, F2 = father nervous, F3 = father fearful/anxious, F4 = father general worries, F7 = father worries future, F8 = father heart pounding, F9 = father worries family, C1f = father reported specific fears, C2f = father reported child nervous, C3f = father reported child fearful/anxious, C4f = father reported child general worries, C5f = father reported child dependent, C6f = father reported child fears school. The thickness of the lines corresponds with the strength of the relations between the symptoms. Purple lines are positive relations and red lines are negative relations.

members, and (3) if the intergenerational relations between anxiety symptoms in a group of children with an anxiety disorder was comparable to a group of children without an anxiety disorder. First, we found that multiple relations between anxiety symptoms within and between family members exist. There were various significant relations between family members, but the relations between anxiety symptoms within family members were stronger. Significant relations were found between mother and child and also father and child. Mothers' anxiety symptoms had slightly more significant relations with children's anxiety symptoms than father's anxiety symptoms. There were also relations between father's and mother's anxiety symptoms. The strongest relations between family members were among similar symptoms. Second, the general feeling of being fearful had a

Table 5. *CS-coefficients of the mother–child and father–child anxiety symptoms network in the Anxiety group and the Other group*

		CS-coefficients		
Group	Network	Strength	Closeness	Betweenness
Anxiety	Mother–child	0.44	0.36	0.05
	Father–child	0.28	0.13	0.05
Other	Mother–child	0.36	0.00	0.00
	Father–child	0.05	0.00	0.75

Table 6. *Edge weights of between-person relations that were significantly ($p < 0.05$) or marginally significantly ($0.05 > p < 0.10$) different between the Anxiety group and the Other group*

Node		Description		Strength		
Parent	Child	Parent	Child	Anxiety	Other	*p*
Mother–child						
M1	C3m	Specific fears	Fearful/ anxious	0.000	0.239	0.01
M1	C4m	Specific fears	General worries	0.000	−0.136	0.04
M9	C6m	Worries family	Fears school	0.000	−0.199	0.00
M4	C5m	General worries	Dependent	0.038	−0.069	0.02
M4	C6m	General worries	Fears school	0.009	0.252	0.01
M4	C3m	General worries	Fearful/ anxious	0.000	−0.044	0.06
Father–child						
F2	C6f	Nervous	Fears school	0.000	0.145	0.01
F9	C3f	Worries family	Fearful/ anxious	0.000	0.183	0.05
F4	C6f	General worries	Fears school	0.000	−0.176	0.03

Note: In total, there were 42 between-person relations in both the mother–child and father–child networks.

central role within paternal, maternal, and childhood anxiety. Third, there were more relations between parental anxiety symptoms and child anxiety symptoms in the group with children without an anxiety disorder (but with other psychopathology) than in the group of children with an anxiety disorder, especially between mothers' and children's symptoms. The relations in the group with other psychopathology were both positive and negative, meaning that some child anxiety symptoms corresponded to higher parent anxiety symptoms, while other child anxiety symptoms corresponded with lower parent anxiety symptoms. The relations in the anxiety group (and especially in the mother–child network) seemed to be more specific (i.e., more positive relations across the same anxiety symptoms of child and parent) than in the group with other disorders.

The current study indicates that there are relations between anxiety symptoms within individuals and also relations between anxiety symptoms for different family members. The results also suggest that the relations within the individual are generally stronger than the relations between individuals. While parental transmission on an anxiety symptom level in the current study was not as clear as might be expected, these findings do not necessarily mean that parental transmission of anxiety is to be neglected. That is, evidence of significant relations between children and their parents on a symptom level were also found in the current study. Overall, these findings are in line with the general idea that anxiety problems develop because of an interaction between temperamental and environmental risk factors (Degnan, Almas & Fox, 2010).

The anxiety symptoms in fathers were only slightly differently related to the child anxiety symptoms than were the anxiety symptoms in mothers, i.e., specific fears were more strongly related in the mother–child model than in the father–child model. Following studies on specific phobia, it is known that vicarious learning is involved in the development of specific fears (Merckelbach, de Jong, Muris & van den Hout, 1996). In addition, based on previous studies investigating possible differences between the roles of fathers and mothers in the etiology, maintenance, or treatment of childhood anxiety, we know that fathers may be more or differently important in the intergenerational transmission of anxiety (Bögels & Phares, 2008). It could be hypothesized that – as mothers are generally more often the primary caregivers –- the child and mother may share more (anxious) events and/or the child gets exposed more by the mother's specific fear (reaction). On the contrary, based on evolutionary models, it has been suggested that fathers are especially important in the external environment fears (Bögels & Perotti, 2011; Möller, Majdandžić & Bögels, 2015). More research is clearly needed to get a better understanding of similarities and differences in the relation between fathers' and mothers' anxiety and children's anxiety at a more detailed level.

Another important finding was that the strongest relations between anxiety symptoms in family members were found among similar symptoms. A possible explanation for this finding could be that these particular symptoms are transmitted from parents to children by a specific genetic component or through parenting styles or modeling. Alternatively, or additionally, our finding could also be explained by the fact that we used parental reports for measuring both parental and childhood anxiety symptoms. When parents experience certain anxiety symptoms themselves, it could be that they more easily recognize similar symptoms in their children and/or that they think their child is (also) suffering from the same symptoms (biased perception; Rapee & Heimberg, 1997). For example, Bögels and van Melick (2004) found that parents' reports on questionnaires about anxiety in themselves and in their children were strongly correlated, while the relations between parents' reports about their child's anxiety and children's reports about their own anxiety did not reach significance. In addition, the current study found that the general feeling of being fearful had a central role in the expression of anxiety for all family members. This finding seems argumentative, since the general feeling of being fearful relates to the core symptoms of all types of anxiety disorders (American Psychiatric Association, 2013). This advocates for the robustness of the centrality of the general feeling of being fearful in children as well as in adults, and for females (mothers) as well as for males (fathers).

We found significant relations between fathers' and mothers' anxiety symptoms. These relations were mainly between the same symptoms (worrying about the future and specific fears). This is in line with previous studies that found significant associations between maternal and paternal anxiety (Ierardi, Ferro, Trovato, Tambelli & Riva Crugnola, 2019; Parrigon & Kerns, 2016). How best to explain these partner associations, however, requires further investigation. For example, previous studies identified partner conflict as a factor that could explain the association between anxiety symptoms among parents (Dehle & Weiss, 2002; McLeod, 1994; Parrigon & Kerns, 2016). In addition, partner associations on a symptom level could (also) possibly be explained by daily struggles. For example, if both parents report that they worry a lot about the future, it could be that they have realistic worries within the family (illness, finances, etc.). Nonetheless, the finding of partner associations suggests that anxiety in families runs not only between parents and children but also between partners.

Finally, we found more specific relations between parental (especially maternal) and child anxiety in families with a child with an anxiety disorder than in families with a child with other psychopathology. These findings could be explained by the more specific intergenerational transmission of anxiety problems compared with other types of psychopathologies (Leijdesdorff, van Doesum, Popma, Klaassen & van Amelsvoort, 2017) and are in line with studies demonstrating that parents of children with an anxiety disorder are more likely to have more anxiety problems themselves (Last, Hersen, Kazdin, Orvaschel & Perrin, 1991; Lieb, Wittchen, Höfler, Fuetsch, Stein & Merikangas, 2000).

A strength of the current study was that we examined the relation between anxiety in fathers, mothers, and children at a symptom level in a large clinical and heterogenetic sample. Most previous studies examined relations at a disorder level, did not include fathers, or focused only on parents of children with anxiety disorders. This study therefore provides a broader perspective on the relation between child and parental anxiety and its underlying dynamics (i.e., how the anxiety symptoms are related within and between family members). In addition, the use of a network analysis approach enabled us to investigate the relations between anxiety symptoms of the father, mother, and child on a more detailed level.

The current study also had limitations. First, parents reported on their children's anxiety symptoms. These parental reports could be biased because of the parent's own anxiety symptoms. Even though there were relatively strong relations between fathers' and mothers' reports of the same child anxiety symptoms, it is important for future studies to use child reports as well as parent reports. In addition, other measures, such as observations, behavioral assessments, or implicit measures (in addition to the questionnaires), would be helpful in studying the relation between child and parent anxiety symptoms. Second, although the use of a clinical heterogeneous sample is a strength (more variance in responding), it also has its disadvantages. Children of anxious parents are also at risk for other types of (internalizing) disorders, and parents of clinically anxious children also experience other types of psychopathologies than anxiety disorders (Fisak & Grills-Taquechel, 2007; Middeldorp, Wesseldijk, Hudziak, Verhulst, Lindauer & Dieleman, 2016). In future studies, it could therefore be interesting to investigate the relations between a broader range of symptoms (i.e., not only anxiety) in children and their parents using different clinical samples as well as typically developing children, to explore these relations both on a symptom and on a disorder level. Another future direction is to investigate the (specific) relation between parental and child anxiety symptoms by including a top-down sample of parents with mental disorders including anxiety disorders (next to the bottom-up approach that was used in this study by selecting children with mental disorders). A third limitation of the current study is that the sample included predominately parents who were living together and were the biological parents of the child. Given the findings of previous studies that family functioning and family structure can be related to the development of psychopathology in children (Cohen & Brook, 1987; Gotlib & Avison, 1993), it could be interesting for future studies to compare the relations between anxiety symptoms in families when parents live together versus when they are separated. Furthermore, it would be interesting to include anxiety symptoms in siblings in the network analyses. In this way, it would be possible not only to study the relations between anxiety symptoms among siblings but also to investigate possible differences between parents and different children living in the same family. Siblings often have common risk factors for the development of psychopathology, and psychopathology in one child can influence family functioning (Burt, 2009; Kelvin, Goodyer & Altham, 1996). Studying these family relations using a network approach may be a new approach in studying the family dynamics in the development of childhood anxiety and may increase our understandings of complex family interactions. Finally, it is not possible to draw conclusions about causality between symptoms with a network analysis approach, meaning that it remains unclear if parental symptoms lead to anxiety symptoms in children and/or the other way around. The described relationships between parental and childhood anxiety were (only) correlational, hampering conclusions about whether child anxiety is influenced by parental anxiety and/or vice versa.

In line with previous research, this study showed that childhood anxiety is related to parental anxiety (Lawrence, Murayama & Creswell, 2019). Multiple relations between anxiety symptoms in parents and children were found, but the general feeling of being fearful played a central role within fathers, mothers, and children. Overall, the relations between child and parental anxiety symptoms were more specific in families with a child with an anxiety disorder than in families with children with other types of disorders. These results stress the importance of further examining factors responsible for this family-anxiety transmission.

CONFLICT OF INTEREST

No potential competing interest was reported by the authors.

DATA AVAILABILITY STATEMENT

Data available on request due to privacy/ethical restrictions.

ENDNOTE

[1] The Other group that was used for the network was a random sample (N = 350) of the total participants without an anxiety disorder diagnosis (N = 1,102). The correlations between the edge-weight matrices of the Other random sample and the total Other participants were 1.000, showing that the subsample was indeed a random sample and a representative sample of the whole group.

REFERENCES

Achenbach, T.M., Becker, A., Döpfner, M., Heiervang, E.R., Roessner, V., Steinhausen, H.-C. *et al.* (2008). Multicultural assessment of child and adolescent psychopathology with ASEBA and SDQ instruments: Research findings, applications, and future directions. *Journal of Child Psychology and Psychiatry*, *49*(3), 251–275. https://doi.org/10.1111/j.1469-7610.2007.01867.x.

Achenbach, T.M., Newhouse, P.A. & Rescorla, L. (2004). *Manual for the ASEBA older adult forms and profiles*. ASEBA.

Ainsworth, M.D.S., Blehan, M.C., Waters, E. & Wall, S.N. (2015). *Patterns of attachment: A psychological study of the strange situation*. New York, NY, USA: Psychology Press.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders 5th ed. (DSM-5)* https://doi.org/10.1176/appi.books.9780890425596.

Beidel, D.C. & Turner, S.M. (1997). At risk for anxiety: I. Psychopathology in the offspring of anxious parents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*(7), 918–924. https://doi.org/10.1097/00004583-199707000-00013.

Biederman, J., Rosenbaum, J.F., Bolduc, E.A., Faraone, S.v. & Hirshfeld, D.R. (1991). A high risk study of young children of parents with panic disorder and agoraphobia with and without comorbid major depression. *Psychiatry Research*, *37*(3), 333–348. https://doi.org/10.1016/0165-1781(91)90068-Z.

Biringen, Z. & Easterbrooks, M.A. (2012a). Emotional availability: Concept, research, and window on developmental psychopathology. *Development and Psychopathology*, *24*(1), 1–8. https://doi.org/10.1017/S0954579411000617.

Biringen, Z. & Easterbrooks, M.A. (2012b). The integration of emotional availability into a developmental psychopathology framework: Reflections on the special section and future directions. *Development and Psychopathology*, *24*(1), 137–142. https://doi.org/10.1017/S0954579411000733.

Bodden, D.H.M., Dirksen, C.D. & Bögels, S.M. (2008). Societal burden of clinically anxious youth referred for treatment: A cost-of-illness study. *Journal of Abnormal Child Psychology*, *36*(4), 487–497. https://doi.org/10.1007/s10802-007-9194-4.

Bögels, S.M., Bamelis, L. & van der Bruggen, C.O. (2008). Parental rearing as a function of parent's own, partner's, and child's anxiety status: Fathers make the difference. *Cognition & Emotion*, *22*(3), 522–538. https://doi.org/10.1080/02699930801886706.

Bögels, S.M. & Brechman-Toussaint, M.L. (2006). Family issues in child anxiety: Supplementary, family functioning, parental rearing and beliefs. *Clinical Psychology Review*, *26*(7), 834–856. https://doi.org/10.1016/j.cpr.2005.08.001.

Bögels, S.M. & Perotti, E.C. (2011). Does father know best? A formal model of the paternal influence on childhood social anxiety. *Journal of Child and Family Studies*, *20*(2), 171–181. https://doi.org/10.1007/s10826-010-9441-0.

Bögels, S.M. & Phares, V. (2008). Fathers' role in the etiology, prevention and treatment of child anxiety: A review and new model. *Clinical Psychology Review*, *28*(4), 539–558. https://doi.org/10.1016/j.cpr.2007.07.011.

Bögels, S.M. & van Melick, M. (2004). The relationship between child-report, parent self-report, and partner report of perceived parental rearing behaviors and anxiety in children and parents. *Personality and Individual Differences*, *37*(8), 1583–1596. https://doi.org/10.1016/j.paid.2004.02.014.

Borsboom, D., Cramer, A.O.J., Schmittmann, V.D., Epskamp, S. & Waldorp, L.J. (2011). The small world of psychopathology. *PLoS One*, *6*(11), e27407. https://doi.org/10.1371/journal.pone.0027407.

Burt, S.A. (2009). Rethinking environmental contributions to child and adolescent psychopathology: A meta-analysis of shared environmental influences. *Psychological Bulletin*, *135*(4), 608–637. https://doi.org/10.1037/a0015702.

Cohen, P. & Brook, J. (1987). Psychiatry interpersonal and biological processes family factors related to the persistence of psychopathology in childhood and adolescence. *Psychiatry*, *50*, 332–345. https://doi.org/10.1080/00332747.1987.11024365.

Colonnesi, C., Draijer, E.M., Stams, G.J.J.M., van der Bruggen, C.O., Bögels, S.M. & Noom, M.J. (2011). The relation between insecure supplementary and child anxiety: A meta-analytic review. *Journal of Clinical Child & Adolescent Psychology*, *40*(4), 630–645. https://doi.org/10.1080/15374416.2011.581623.

Creswell, C. & Cartwright-Hatton, S. (2007). Family treatment of child anxiety: Outcomes, limitations and future directions. *Clinical Child and Family Psychology Review*, *10*(3), 232–252. https://doi.org/10.1007/s10567-007-0019-3.

Degnan, K.A., Almas, A.N. & Fox, N.A. (2010). Temperament and the environment in the etiology of childhood anxiety. *Journal of Child Psychology and Psychiatry*, *51*(4), 497–517. https://doi.org/10.1111/j.1469-7610.2010.02228.x.

Dehle, C. & Weiss, R.L. (2002). Associations between anxiety and marital adjustment. *Journal of Psychology: Interdisciplinary and Applied*, *136*(3), 328–338. https://doi.org/10.1080/00223980209604160.

Dubuis-Stadelmann, E., Fenton, B.T., Ferrero, F. & Preisig, M. (2001). Spouse similarity for temperament, personality and psychiatric symptomatology. *Personality and Individual Differences*, *30*(7), 1095–1112. https://doi.org/10.1016/S0191-8869(00)00092-1.

Epskamp, S., Borsboom, D. & Fried, E.I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods*, *50*(1), 195–212. https://doi.org/10.3758/s13428-017-0862-1.

Epskamp, S., Cramer, A.O.J., Waldorp, L.J., Schmittmann, V.D. & Borsboom, D. (2012). Qgraph: Network visualizations of relationships in psychometric data. *Journal of Statistical Software*, *48*(4), 1–18. http://www.jstatsoft.org/.

Fisak, B. & Grills-Taquechel, A.E. (2007). Parental modeling, reinforcement, and information transfer: Risk factors in the development of child anxiety? *Clinical Child and Family Psychology Review*, *10*(3), 213–231. https://doi.org/10.1007/s10567-007-0020-x.

Gotlib, I.H. & Avison, W.R. (1993). Children at risk for psychopathology. In C.G. Costello (Ed.), *Basic issues in psychopathology* (pp. 271–319). New York, NY, USA: Guilford Press.

Ierardi, E., Ferro, V., Trovato, A., Tambelli, R. & Riva Crugnola, C. (2019). Maternal and paternal depression and anxiety: Their relationship with mother-infant interactions at 3 months. *Archives of Women's Mental Health*, *22*(4), 527–533. https://doi.org/10.1007/s00737-018-0919-x.

In-Albon, T. & Schneider, S. (2007). Psychotherapy of childhood anxiety disorders: A meta-analysis. *Psychotherapy and Psychosomatics*, *76*(1), 15–24. https://doi.org/10.1159/000096361.

Keller, M.B. (1992). The naturalistic course of anxiety and depressive disorders. *Clinical Neuropharmacology*, *15*, 171A–173A. https://doi.org/10.1097/00002826-199201001-00091.

Kelvin, R.G., Goodyer, I.M. & Altham, P.M.E. (1996). Temperament and psychopathology amongst siblings of probands with depressive and anxiety disorders. *Journal of Child Psychology and Psychiatry*, *37*(5), 543–550. https://doi.org/10.1111/j.1469-7610.1996.tb01440.x.

Kerns, K.A. & Brumariu, L.E. (2014). Is insecure parent-child supplementary a risk factor for the development of anxiety in childhood or adolescence? *Child Development Perspectives*, *8*(1), 12–17. https://doi.org/10.1111/cdep.12054.

Krohne, H.W. (1990). Parental childrearing and anxiety development. In K. Hurrelmann & F. Loesel (Eds.), *Health hazards in adolescence. Prevention and intervention in childhood and adolescence* (Vol. *8*, pp. 115–130). Berlin, Germany: Walter De Gruyter.

Krohne, H.W. (1992). Developmental conditions of anxiety and coping: A two-process model of child-rearing effects. In K.A. Hagtvet & T.B. Johnsen (Eds.), *Advances in test anxiety research* (Vol. *7*, pp. 143–155). Lisse, Netherlands: Swets and Zeitlinger.

Last, C.G., Hersen, M., Kazdin, A., Orvaschel, H. & Perrin, S. (1991). Anxiety disorders in children and their families. *Archives of General Psychiatry*, *48*(10), 928–934. https://doi.org/10.1001/archpsyc.1991.01810340060008.

Lawrence, P.J., Murayama, K. & Creswell, C. (2019). Systematic review and meta-analysis: Anxiety and depressive disorders in offspring of parents with anxiety disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *58*(1), 46–60. https://doi.org/10.1016/j.jaac.2018.07.898.

Leijdesdorff, S., van Doesum, K., Popma, A., Klaassen, R. & van Amelsvoort, T. (2017). Prevalence of psychopathology in children of parents with mental illness and/or addiction: An up to date narrative review. *Current opinion in psychiatry*, *30*(4), 312–317). Lippincott Williams and Wilkins. https://doi.org/10.1097/YCO.0000000000000341.

Lieb, R., Wittchen, H.U., Höfler, M., Fuetsch, M., Stein, M.B. & Merikangas, K.R. (2000). Parental psychopathology, parenting styles, and the risk of social phobia in offspring: A prospective-longitudinal community study. *Archives of General Psychiatry*, *57*(9), 859–866. https://doi.org/10.1001/archpsyc.57.9.859.

Low, N., Cui, L. & Merikangas, K.R. (2007). Spousal concordance for substance use and anxiety disorders. *Journal of Psychiatric Research*, *41*(11), 942–951. https://doi.org/10.1016/j.jpsychires.2006.11.003.

Mascendaro, P.M., Herman, K.C. & Webster-Stratton, C. (2012). Parent discrepancies in ratings of young children's co-occurring internalizing symptoms. *School Psychology Quarterly*, *27*(3), 134–143. https://doi.org/10.1037/a0029320.

McLeod, B.D., Wood, J.J. & Weisz, J.R. (2007). Examining the association between parenting and childhood anxiety: A meta-analysis. *Clinical Psychology Review*, *27*(2), 155–172. https://doi.org/10.1016/j.cpr.2006.09.002.

McLeod, J.D. (1994). Anxiety disorders and marital quality. *Journal of Abnormal Psychology*, *103*(4), 767–776. https://doi.org/10.1037/0021-843X.103.4.767.

Merckelbach, H., de Jong, P.J., Muris, P. & van den Hout, M.A. (1996). The etiology of specific phobias: A review. *Clinical Psychology Review*, *16*(4), 337–361. https://doi.org/10.1016/0272-7358(96)00014-1.

Middeldorp, C.M., Wesseldijk, L.W., Hudziak, J.J., Verhulst, F.C., Lindauer, R.J.L. & Dieleman, G.C. (2016). Parents of children with psychopathology: Psychiatric problems and the association with their child's problems. *European Child and Adolescent Psychiatry*, *25*(8), 919–927. https://doi.org/10.1007/s00787-015-0813-2.

Möller, E.L., Majdandžić, M. & Bögels, S.M. (2015). Parental anxiety, parenting behavior, and infant anxiety: Differential associations for fathers and mothers. *Journal of Child and Family Studies*, *24*(9), 2626–2637. https://doi.org/10.1007/s10826-014-0065-7.

Möller, E.L., Nikolić, M., Majdandžić, M. & Bögels, S.M. (2016). Associations between maternal and paternal parenting behaviors, anxiety and its precursors in early childhood: A meta-analysis. *Clinical Psychology Review*, *45*, 17–33. https://doi.org/10.1016/j.cpr.2016.03.002.

Moreno, J., Silverman, W.K., Saavedra, L.M. & Phares, V. (2008). Fathers' ratings in the assessment of their Child's anxiety symptoms: A comparison to Mothers' ratings and their associations with paternal symptomatology. *Journal of Family Psychology*, *22*(6), 915–919. https://doi.org/10.1037/a0014097.

Muris, P., Merckelbach, H., de Jong, P.J. & Ollendick, T.H. (2002). The etiology of specific fears and phobias in children: A critique of the non-associative account. *Behaviour Research and Therapy*, *40*(2), 185–195. https://doi.org/10.1016/S0005-7967(01)00051-1.

Muris, P., Steerneman, P., Merckelbach, H. & Meesters, C. (1996). The role of parental fearfulness and modeling in children's fear. *Behaviour Research and Therapy*, *34*(3), 265–268. https://doi.org/10.1016/0005-7967(95)00067-4.

Nakamura, B.J., Ebesutani, C., Bernstein, A. & Chorpita, B.F. (2009). A psychometric analysis of the child behavior checklist DSM-oriented scales. *Journal of Psychopathology and Behavioral Assessment*, *31*(3), 178–189. https://doi.org/10.1007/s10862-008-9119-8.

Nauta, M.H., Scholing, A., Emmelkamp, P.M.G. & Minderaa, R.B. (2003). Cognitive-behavioral therapy for children with anxiety disorders in a clinical setting: No additional effect of a cognitive parent training. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*(11), 1270–1278. https://doi.org/10.1097/01.chi.0000085752.71002.93.

Öst, L.G. & Ollendick, T.H. (2017). Brief, intensive and concentrated cognitive behavioral treatments for anxiety disorders in children: A systematic review and meta-analysis. *Behaviour Research and Therapy*, *97*, 134–145. https://doi.org/10.1016/j.brat.2017.07.008.

Parrigon, K.L.S. & Kerns, K.A. (2016). Family processes in child anxiety: The long-term impact of fathers and mothers. *Journal of Abnormal Child Psychology*, *44*(7), 1253–1266. https://doi.org/10.1007/s10802-015-0118-4.

Polanczyk, G.V., Salum, G.A., Sugaya, L.S., Caye, A. & Rohde, L.A. (2015). Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*, *56*(3), 345–365. https://doi.org/10.1111/jcpp.12381.

Rapee, R.M. (2012). Family factors in the development and management of anxiety disorders. *Clinical Child and Family Psychology Review*, *15*(1), 69–80. https://doi.org/10.1007/s10567-011-0106-3.

Rapee, R.M. & Heimberg, R.G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, *35*, 741–756. https://doi.org/10.1016/S0005-7967(97)00022-3.

Rapee, R.M., Schniering, C.A. & Hudson, J.L. (2009). Anxiety disorders during childhood and adolescence: Origins and treatment. *Annual Review of Clinical Psychology*, *5*(1), 311–341. https://doi.org/10.1146/annurev.clinpsy.032408.153628.

Shimada-Sugimoto, M., Otowa, T. & Hettema, J.M. (2015). Genetics of anxiety disorders: Genetic epidemiological and molecular studies in humans. *Psychiatry and Clinical Neurosciences*, *69*(7), 388–401. https://doi.org/10.1111/pcn.12291.

Stein, M.B., Jang, K.L. & Livesley, W.J. (1999). Heritability of anxiety sensitivity: A twin study. *American Journal of Psychiatry*, *156*(2), 246–251. https://doi.org/10.1176/ajp.156.2.246.

Stuijfzand, S., Creswell, C., Field, A.P., Pearcey, S. & Dodd, H. (2018). Research review: Is anxiety associated with negative interpretations of ambiguity in children and adolescents? A systematic review and meta-analysis. *Journal of Child Psychology and Psychiatry*, *59*(11), 1127–1142. https://doi.org/10.1111/jcpp.12822.

Telman, L.G.E., van Steensel, F.J.A., Maric, M. & Bögels, S.M. (2018). What are the odds of anxiety disorders running in families? A family study of anxiety disorders in mothers, fathers, and siblings of children with anxiety disorders. *European Child and Adolescent Psychiatry*, *27*(5), 615–624. https://doi.org/10.1007/s00787-017-1076-x.

van Borkulo, C., Boschloo, L., Kossakowski, J. & Tio, P. (2017). *Comparing network structures on three aspects: A permutation test* https://doi.org/10.13140/RG.2.2.29455.38569.

van der Bruggen, C.O., Stams, G.J.J.M. & Bögels, S.M. (2008). Research review: The relation between child and parent anxiety and parental control: A meta-analytic review. *Journal of child psychology and psychiatry, and allied disciplines*, *49*(12), 1257–1269). John Wiley & Sons, Ltd. https://doi.org/10.1111/j.1469-7610.2008.01898.x.

van Grootheest, D.S., van den Berg, S.M., Cath, D.C., Willemsen, G. & Boomsma, D.I. (2008). Marital resemblance for obsessive-compulsive, anxious and depressive symptoms in a population-based sample. *Psychological Medicine*, *38*(12), 1731–1740. https://doi.org/10.1017/S0033291708003024.

van Niekerk, R.E., Klein, A.M., Allart-van Dam, E., Rinck, M., Souren, P.M., Hutschemaekers, G.J.M. *et al*. (2018). Biases in interpretation as a vulnerability factor for children of parents with an anxiety disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *57*(7), 462–470. https://doi.org/10.1016/j.jaac.2018.04.009.

Verhoeven, M., Bögels, S.M. & van der Bruggen, C.C. (2012). Unique roles of mothering and fathering in child anxiety; moderation by Child's age and gender. *Journal of Child and Family Studies*, *21*(2), 331–343. https://doi.org/10.1007/s10826-011-9483-y.

Wood, J.J., McLeod, B.D., Sigman, M., Hwang, W.-C. & Chu, B.C. (2003). Parenting and childhood anxiety: Theory, empirical findings, and future directions. *Journal of Child Psychology and Psychiatry*, *44* (1), 134–151. https://doi.org/10.1111/1469-7610.001.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Table S1. *Edge weights of the full model with the relations between fathers' anxiety symptoms, mothers' anxiety symptoms, and children's anxiety symptoms as reported by the fathers and mothers*

Table S2. *Edge weights of the model with the relations between mothers' anxiety symptoms and children's anxiety symptoms as reported by the mothers in the Anxiety group and in the Other group*

Table S3. *Edge weights of the model with the relations between fathers' anxiety symptoms and children's anxiety symptoms as reported by the fathers in the Anxiety group and in the Other group*

Fig. S1. Plots of the non-parametric bootstrapping procedure (left) and of the case bootstrapping procedure (right).

Received 23 November 2022, Revised 18 October 2023, accepted 29 October 2023