Preschool predictors of childhood anxiety disorders: a prospective community study

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Background: Anxiety disorders are often present at preschool age. Research on older children and studies contrasting preschoolers with high versus low behavioral inhibition (BI) highlight several risk factors, but these have not been investigated in community samples of young children. Child, parent, and peer factors at age 4 were therefore examined as potential predictors of anxiety disorders at age 6. **Methods:** Two birth cohorts of 4-year olds living in the city of Trondheim, Norway, were screened for emotional and behavioral problems. A subsample oversampled for emotional and behavioral problems were drawn to take part in the study; 82.1% consented. Parents of 1000 children were interviewed with the Preschool Age Psychiatric Assessment and provided ratings of children's BI, victimization by peers and their own anxiety symptoms. Assessments of attachment and parent–child interaction were based on observation. Preschool teachers rated children's social competence. Children were reassessed after 2 years ($N = 797$). **Results:** High scores on BI, attention-deficit/hyperactivity disorder, parental anxiety, and peer victimization, along with low scores on social skills at age 4 collectively predicted anxiety disorders at age 6 after controlling for initial anxiety and other disorders. The effect of parental anxiety did only apply to children with high levels of BI. No effects of age-4 anxiety, gender, parenting, parental SES, divorce, peer acceptance, or attachment emerged. **Conclusions:** Behavioral inhibition, parental anxiety, and peer victimization function as risk factors whereas high social competence may protect against anxiety disorders in young children. **Keywords:** Preschool, anxiety, behavioral inhibition, bullying, social competence.

Introduction

Anxiety disorders are common in childhood and adolescence (Costello, Egger, & Angold, 2005), tend to persist (Hudson, Dodd, Lyneham, & Bovopoulous, 2011) and may have debilitating, longer term consequences (Knapp, King, Healey, & Thomass, 2011). Hence, prevention, early identification, and treatment are called for. To realize these goals, we need to identify risk and protective factors early in life. Conceptually, a range of child, parent, and peer processes may add to, mediate and/or moderate the effect of risk and protective factors within the child, parents, or the environment. *Additively*, for example, the combination of anxiogenetic parenting and child behavioral inhibition (BI) increase the risk of anxiety disorders beyond either influence alone (Kerns, Siener, & Brumariu, 2011). *Mediationally*, for example, shy or inhibited children may evoke overprotective parenting (i.e. the mediator) and thereby promote anxiety (Lengua & Kovacs, 2005). *Moderationally*, for example, BI (i.e. the moderator) may amplify the effect of parental anxiety on child anxiety (Hudson et al., 2011).

Preschool anxiety disorders

Burgeoning research on *school-aged* children's anxiety illuminates its nature, etiology, and sequelae (Murray, Creswell, & Cooper, 2009; Rapee, Schniering, & Hudson, 2009). Comparable information on younger children is lacking, even though anxiety disorders often emerge in the preschool years (Egger & Angold, 2006). Although some early risk factors have been identified, such as, temperamental shyness, overcontrolling parenting, parental anxiety (Biederman et al., 2001; Dodd, Hudson, Morris, & Wise, 2012; Edwards, Rapee, & Kennedy, 2010; Hudson et al., 2011; Muris, van Brakel, Arntz, & Schouten, 2011; Pahl, Barrett, & Gullo, 2012), existing research is limited, having not taken anxiety or other comorbid disorders that precede the measurement of these 'predictors' into consideration (Dodd et al., 2012; Edwards et al., 2010; Hudson et al., 2011; Muris et al., 2011). Because early emerging anxiety is likely to be correlated with most alleged risk factors for later anxiety disorders and is often associated with other disorders (Egger & Angold, 2006), controlling for initial anxiety as well as the presence of other disorders becomes essential for discerning true risk factors. The study reported herein extends existing research by overcoming each of these methodological limitations.

As it turns out, research on anxiety *disorders* per se is scarce during the preschool years (Dodd et al., 2012; Hudson et al., 2011; Muris et al., 2011), as most relevant study relies on rating scales, treating anxiety dimensionally (Edwards et al., 2010; Kerns et al., 2011). We do not know, although, how well continuous rating scales translate into diagnosable disorders. Thus, the generalizability of findings using anxiety-symptom checklists and rating scales to diagnosable anxiety disorders remains uncertain. Then there is the fact that all prospective studies of preschoolers' anxiety disorders compare groups of behaviorally inhibited children with children showing little or no BI (Hudson et al., 2011; Muris et al., 2011). Although such extreme group approaches are cost-efficient, they can inflate effects sizes, consequently mis-specifying relations in the general population between a predictor (e.g. BI) and outcome (e.g. anxiety) (Preacher, Rucker, MacCallum, & Nicewander, 2005). Thus, in the current community study, we sample children broadly, even while oversampling children showing problems.

Because child, parent, and peer factors have rarely be included in the same research (Degnan, Almas, & Fox, 2010), evidence of addition, mediation and/or moderation involving them remains limited. We thus seek to (a) identify child and parent constitutional and background factors which increase or decrease the likelihood of children developing anxiety disorders, (b) determine whether more proximal child, peer, and family behavioral factors add to and/or mediate risk stemming from such background factors, and (c) investigate whether some risk factors make children particularly vulnerable to the effect of other risk factors. This overall model which includes distal and proximal risk factors is depicted in Figure 1 and its components are detailed below. For presentational simplicity, moderational paths are not included.

Distal risk factors

Several temporally distal risk factors in the child and the parents are hypothesized to originate early in the causal process of childhood anxiety. One of the most researched is BI, which refers to a propensity to react to novel situations with withdrawal and wariness. Conceptually, it is closely related to constructs such as fearful or reactive temperament and approach/withdrawal. As it predicts future anxiety over and beyond initial anxiety (Hudson et al., 2011; Muris et al., 2011), it is an essential 'distal' risk factor to examine. What remains unclear is whether anxiety disorders and BI are separate constructs or whether anxiety disorders simply reflect extreme expression of a fearful or inhibited temperament (Rapee & Coplan, 2010). It is therefore critical to disentangle the BI and anxiety constructs before any meaningful links between early BI and future anxiety disorders can be evaluated. Thus, we will examine the correlation between the two constructs and determine whether BI items load on the same factor as that of anxiety symptoms.

Several other distal background factors figure importantly in our research. First there are other disorders, especially disruptive ones like attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD) and conduct disorder (CD), as well as other emotional disorders (i.e. depression), because these often co-occur with anxiety disorders (Egger & Angold, 2006; Wichstrøm et al., 2012). Then there is family socioeconomic status (SES) and marital status, as low SES and divorce occur disproportionately among parents of preschoolers with anxiety disorders (Wichstrøm et al., 2012). Parental anxiety is a focus also, given its established role in predicting child anxiety (Hudson et al., 2011; Muris et al., 2011). There is also
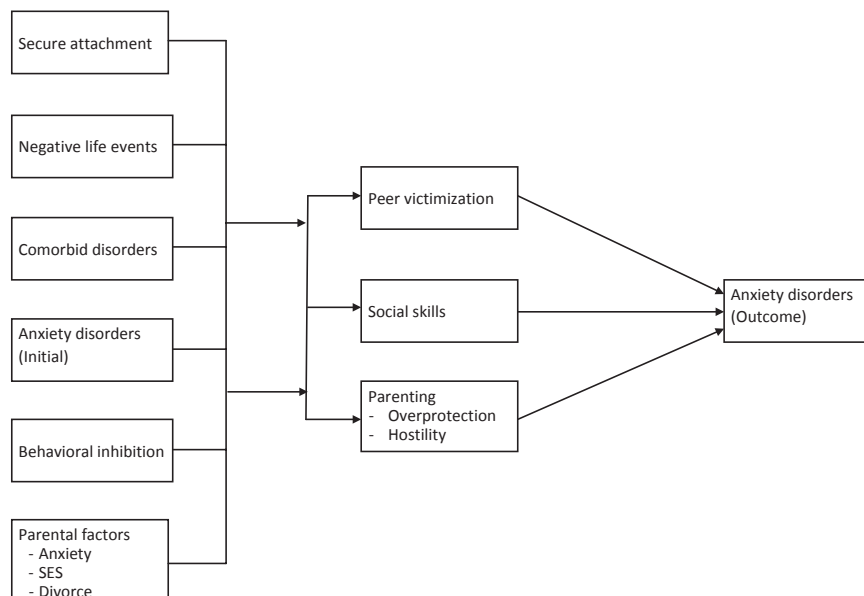

Figure 1 Theoretic model of factors affecting anxiety development in young children

evidence for an association between insecure attachment to parents and anxiety (Colonnesi et al., 2011). Some research finds that negative life-events may increase the risk of anxiety in children, possibly because of a heightened perception of the world as uncertain and threatening (Lengua, Honorado, & Bush, 2007), and we have therefore included negative life-events in our model of distal risk factors.

Proximal factors

Two types of parenting, conceptualized in our model as proximal factors, are associated with anxiety in children, namely, an overprotective/overcontrolling style and a hostile/negativistic one (Rapee et al., 2009). While overcontrol has also been found to be associated, cross-sectionally, with anxiety in preschoolers (Pahl et al., 2012), longitudinal findings are mixed (Edwards et al., 2010; Hudson et al., 2011). Although mostly studied in school-aged children, peer victimization does occur during the preschool years (Barker et al., 2008) and has been implicated in the etiology of anxiety, at least in adolescence (Siegel, La Greca, & Harrison, 2009). One recent study has also linked victimization with psychiatric disorders among preschoolers and preschool anxiety disorder with bully/victimization in first grade (Belden, Gaffrey, & Luby, 2012). However, whether bullying in the preschool years increases the risk of anxiety disorders remains undetermined, a lacuna we plan to address. Finally, the fact that socially anxious children are less socially competent than children without social anxiety (Miers, Blote, & Westenberg, 2010), leads to a focus on social competence as a possible protective and/or mediating factor.

In sum, we first investigate to what extent BI and anxiety disorders correlate and whether BI items and anxiety disorder symptom load on separate or a common factor. Second, as depicted in Figure 1, we examine which distal factors (i.e. negative life-events, anxiety disorders, comorbid disorders, BI, attachment styles, and parent factors) and proximal factors (i.e. peer victimization, social skills, and parenting) at age 4 predict diagnosable anxiety disorders at age 6 in a large community sample. Third, we investigate whether the effect of distal factors is moderated by other identified risk or protective factors.

Methods
Participants and recruitment

Two birth cohorts (born in 2003 or 2004) of 4-year olds living in the city of Trondheim, Norway, and their parents were invited to participate in the study. There were no exclusion criteria except that parents should have a proficiency in Norwegian so that they could be interviewed. Figure 2 shows the recruitment process and the follow-up, with the former described elsewhere (Wichstrøm et al., 2012), so only a brief outline is given here. The total difficulties score of the Strengths and Difficulties Questionnaire (SDQ) 4–16 version (Goodman, Ford, Simmons, Gatward & Meltzer, 2000) was used for screening;
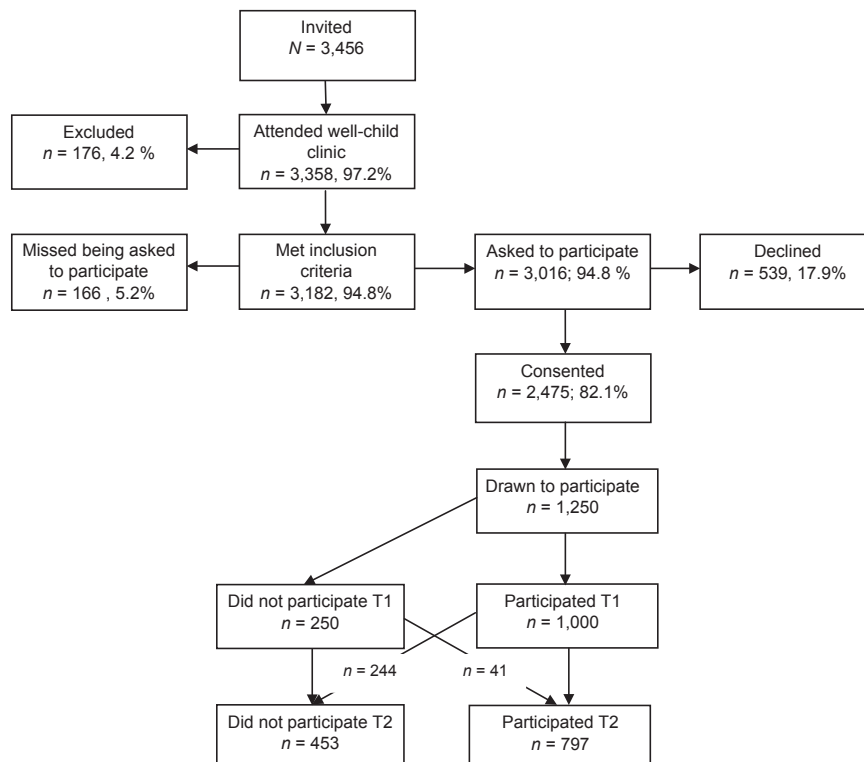
Figure 2 Recruitment and follow-up

scores were divided into four strata: 0–4, 5–8, 9–11, and 12–40. Defined proportions of parents in each stratum (0.37, 0.48, 0.70, and 0.89, respectively) were invited to participate. Children were predominantly in state-sponsored day care centers at initial assessment (T1) (95.0%) and all were attending school at follow-up (T2). Parental educational level was generally high (6.7% without high-school diploma; 17.3% high-school graduates; 17.2% some post high-school education; 58.3% college graduates). The drop-out rate after consenting at the well-child clinic (T1) was unrelated to the SDQ, t (1,250) = .28, p = .78 or gender, χ^2 = 0.23, df = 1, p = .37. At T1, the mean age of the children was 53.0 months (SD = 2.1). Attrition from T1 to T2 was not selective according to any of the study variables except that that teachers rated participating children slightly higher on social competence than nonparticipating ones (Means: 57.24, SD = 12.43 vs. 53.35, SD = 12.69; t [851] = 3.69, p < .001).

Procedure

Research procedures were approved by the Regional Committee for Medical and Health Research Ethics. During the age-4 health checkup at the community health center (T1), nurses informed parents about the study and obtained informed consent. Parents completed a structured diagnostic interview. Thereafter, parent (84.8% mothers) and child visited the University for testing and observation. Retesting took place 2 years later (T2).

Measures

Psychiatric disorders. The Preschool Age Psychiatric Assessment (PAPA) (Egger et al., 2006) is a semistructured psychiatric interview for completion by parents of children ages 2–6 years. The PAPA uses a structured protocol involving both required and optional follow-up questions. Diagnoses are generated by computer algorithms using criteria of the Diagnostic and Statistical Manual of Mental Disorders (fourth edition) (DSM-IV) (American Psychiatric Association, 1994). Because major depression was very rare (.3%) (Wichstrøm et al., 2012), a continuous scale of number of major-depression symptoms was used. Nine percent of the interview audio recordings were recoded by blinded raters. The multivariate interrater reliabilities between rater pairs were as follows: ADHD k = .96; ODD k = .89; CD k = .78; anxiety disorders (social phobia, separation anxiety, generalized anxiety, and specific phobias) k = .89; symptoms of major depressive disorder ICC = .90.

Distal factors. Parent-reported BI was measured with two subscales of the Children's Behavior Questionnaire (CBQ) (Rothbart, Ahadi, Hershey, & Fisher, 2001), Shyness, considered reflective of the social aspect of BI (α = .90) (Kerns et al., 2011) and Fearfulness, reflective of the nonsocial aspect(α = .70). Parent-reported Negative Life Events reflected the sum of (a) 14 significant changes or losses (e.g. parental separation, death of a pet) during the previous 3 months, and (b) life-time occurrence of 27 traumatic events (e.g. death of a parent, poisoning, abuse). To assess family SES, parental occupations were coded according to the International Classifications of Occupations (International Labour Office, 1990). Professionals and leaders were grouped together as having 'high' SES, whereas farmers/fishermen, skilled and unskilled workers were grouped as 'low' SES. Married or cohabitating parents were distinguished from others. Parental anxiety was assessed using Beck's Anxiety Inventory (α = .81) (Beck, Brown, Epstein, & Steer, 1988) completed by the parent who brought the child to the well-child clinic at T1. Attachment representations were measured with the Manchester Child Attachment Story Task (MCAST) (Green, Stanley, Smith, & Goldwyn, 2000). In the MCAST, each child is presented with four attachment-related distress vignettes (e.g. waking up after a night-mare, getting lost at a shopping mall) using doll-play to mobilize specific attachment-related thoughts and behaviors. Each vignette is coded categorically from videotape as secure (B), avoidant (A), ambivalent/resistant (C) or disorganized (D). Following others (Futh, O'Connor, Matias, Green, & Scott, 2008), a continuous scale for each classification was created because previous research has demonstrated the usefulness of a continuous approach when assessing young children's attachment representations with the MCAST (Futh et al., 2008), and continuous scales enhance statistical power and allow us to capture different degrees of the various attachment styles (O'Connor, Bureau, McCartney, & Lyons-Ruth, 2011). Ten percent of MCAST vignettes were recoded by blinded raters. Inter-rater reliability was as follows: A-scale: ICC = .67, B-scale: ICC = .77, C-scale: ICC = .63, and ICC = .70 for the D-scale.

Proximal factors. Teacher-reported Social skills were measured using the Social Skills Rating System (SSRS) total score (α = .89) (Gresham & Elliot, 1990). To reduce common method variance between ratings of social skills and victimization, parents reported on peer victimization of the child. A 6-month period was used for ratings on a 5-point scale applying Olweus' definition of victimization from bullying (Solberg & Olweus, 2003). Parent–child interaction across four observational settings was coded to measure parenting using the Emotional Availability (EA) Scales (Biringen, Robinson, & Emde, 1998). Four dimensions of parenting–sensitivity, structuring, nonintrusiveness, and nonhostility–were each measured by means of seven indicators. Because the four summary parenting scores proved to be substantially correlated (r range: .44–.71), the 28 individual

ratings were subjected to exploratory factor analysis using Maximum Likelihood extraction and oblimin rotation, which resulted in a two-factor solution. One factor reflected 'Intrusiveness and hostility' (α = .86), the other 'Sensitivity and structuring' (α = .89). All raters were blind to all other information on children and families and were trained and certified as reliable scorers by Z. Biringen who developed the EA. Twenty percent of the videotapes were coded by other blinded raters, yielding ICCs of .65 and .68 for Intrusiveness/Hostility scale and Sensitivity/Structuring, respectively.

Statistical analysis

First, we examined relations between BI and anxiety disorders by (a) inspecting the polychoric correlation between the two, and (b) determining, whether, via confirmatory factor analyses, BI items and anxiety disorder symptoms loaded on the same or different factors. Difference in model fit was examined according to Satorra's procedure (Satorra, 2000).The models were tested with a robust maximum likelihood procedure.

Next, a series of interrelated analyses were conducted to identify predictors of anxiety disorders. Because of the large number of measured risk and protective factors, we first identified those significantly related to anxiety disorders at T2, with and without adjusting for T1 anxiety disorders, using a two-step logistic regression. Finally, risk factors identified this way were included in a SEM mediational model where anxiety disorders were regressed on both distal and proximal predictors, and proximal predictors were regressed on distal predictors. Distal factors were allowed to correlate, as were the residuals of proximal factors. Anxiety disorders were treated as an ordered categorical variable. Moderation was examined by entering the product of pairs of these mean centered predictors, one at a time, to the model. Because we had a screen-stratified sample, we conducted weighted analyses using weights proportional to the inverse of the probability of selection of each subject (i.e. low screen scorers were 'weighted up' and high scorers were 'weighted down'); this yielded unbiased general population estimates. Robust confidence intervals were computed using the Horvitz-Thompson estimator. Missing data were handled with a full information maximum likelihood procedure. With the present sample and rate of disorder, we had a power of .91 to detect an OR of 1.5 in a z-transformed variable in logistic regression. All analyses were performed in Mplus 7 (Muthén & Muthén, 1998-2013).

Results

Table 1 displays means and frequencies for all variables. The prevalence of anxiety disorders was similar at T1 and T2: social phobia 1.3% (95% CI: 0.9–1.8)/0.7% (CI: 0.4–14); separation anxiety 1.1% (CI: 0.8–1.6)/1.5% (CI: 1.0–2.2); generalized anxiety 1.3% (CI: .9–1.8)/2.4% (CI: 1.7–3.3); specific phobias 5.6% (CI: 4.6–6.8)/4.2% (CI: 3.2–5.4). The correlation

Table 1 Univariate statistics for predictors and outcome

	Mean or %	SE	95% confidence interval Low	High
Anxiety disorders at T2	7.5% (sample N = 90)	0.7	6.9	9.0
Anxiety disorders at T1	8.2% (sample N = 102)	0.6	7.0	9.5
Distal factors				
ADHD	2.0%	0.20	1.6	2.5
ODD	4.0%	0.40	3.3	4.8
CD	1.4%	0.2	1.0	1.9
Number of symptoms of major depression	.45	0.02	.41	.49
Number of stressful life events	2.61	0.03	2.55	2.67
Behavioral inhibition: shyness	3.19	0.03	3.14	3.24
Behavioral inhibition: fear	3.70	0.02	3.66	3.75
Parental SES (workers)	27.5%	1.1	25.4	29.6
Parents not living together	9.8%	0.6	8.7	11.2
BAI parent	1.91	0.08	1.75	2.06
Proximal factors				
Social skills score	57.44	0.32	56.82	58.06
Avoidant attachment	.20	0.001	.19	.22
Secure attachment	.51	0.01	.49	.54
Ambivalent attachment	.09	0.005	.07	.09
Disorganized attachment	.20	0.007	.19	.22
Observed parenting (EA): hostility/intrusiveness	4.58	0.01	4.55	4.60
Observed parenting (EA): sensitivity/structuring	3.79	0.01	3.77	3.82
Peer acceptance and rejection	4.91	0.03	4.85	4.98
Victimization score	1.39	0.02	1.35	1.43

ADHD, attention-deficit/hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; BAI, Beck's Anxiety Inventory. Figures are weighted back to represent population estimates.

Table 2 Risk and protective factors at age 4 for anxiety disorders at age 6

	Unadjusted		Adjusted for initial anxiety disorders	
	OR	95% CI	OR	95% CI
Anxiety disorder at T1	1.75	0.79–3.84	1.75	0.79–3.84
ADHD	4.07**	1.34–12.35	3.95*	1.28–12.16
ODD	1.41	0.50–3.95	1.24	0.45–3.98
CD	1.96	0.50–7.79	1.73	0.44–6.83
Behavioral inhibition: shyness	1.42**	1.07–1.89	1.39*	1.05–1.83
Behavioral inhibition: fear	1.36	0.98–1.89	1.33	0.96–1.85
Parent SES (high = contrast)	1.02	0.40–2.14	0.97	0.45–2.07
Parents not living together	1.86	0.94–3.67	1.85	0.93–3.60
Parental anxiety	1.11**	1.03–1.18	1.10**	1.03–1.19
Negative life events	1.00	0.82–1.23	0.98	0.80–1.21
Social skills	0.97***	0.95–.99	0.97***	0.95–.99
Parenting: intrusiveness and hostility	0.98	0.91–1.05	0.98	0.92–1.05
Parenting: sensitivity and structuring	1.01	0.96–1.06	1.01	0.96–1.06
Peer victimization	1.49***	1.14–1.96	1.49***	1.23–1.98

ADHD, attention-deficit/hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; NA, not applicable.
$*p \leq .05$, $**p \leq .01$, $***p \leq .001$.

of anxiety disorder with shyness and with fear at T1 were low (.13, .15, respectively, $p < .001$). A one-factor solution with BI items and anxiety disorder symptoms loading on the same factor fitted the data moderately well, $\chi^2 = 574.56$, $df = 295$, $p < .001$, CFI = .939, RSMEA = .032. A solution with BI items and anxiety disorder symptoms loading on separate factors fitted better, $\chi^2 = 372.71$, $df = 293$, $p < .001$, CFI = .983, RSMEA = .017, and significantly so; $\Delta\chi^2 = 201.85$, $df = 2$, $p < .001$.

In step 1 of the logistic-regression analyses, each potential risk and protective factor was individually used to produce unadjusted odds ratios for T2 anxiety disorders (Table 2, first column). Of note is that there was no stability in anxiety disorders. ADHD, BI, social skills, peer victimization, and parental anxiety each significantly predicted anxiety disorders at T2. When adjusted for anxiety disorders at T1 (step 2) these factors remained significant and were therefore included in the next step of the analyses. To investigate the relationship between anxiety at age 4 and 6 further we computed a summary score reflecting the number of anxiety disorders and symptoms, respectively. The correlation between number of anxiety disorders at age 4 and 6 and anxiety disorder symptoms at age 4 and 6 were .16 and .24, $p < .001$, respectively.

In this step 3, a path model with ADHD, parental anxiety and BI as distal variables and social skills and peer victimization as proximal/mediating variables was tested, resulting in AIC = 16,812.30, sample size adjusted BIC = 16,865,33. However, including direct effects from distal factors to anxiety at T2 resulted in a model with improved fit, AIC = 16,802.58, Sample size adjusted BIC = 16,860.30, $\Delta\chi^2 = 7.83$, $df = 3$, $p = .05$. A model trimmed for insignificant paths did not result in poorer fit and was therefore preferred $\Delta\chi^2 = 5.81$, $df = 3$, $p = .12$. Figure 3 displays standardized path
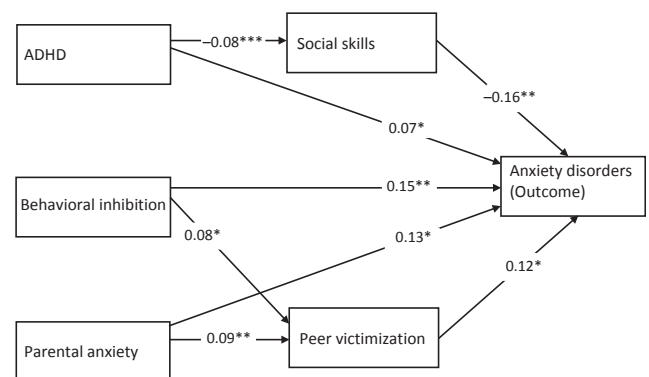

Figure 3 Path model of distal and proximal factors at age 4 predicting anxiety disorders at age 6 (standardized coefficients)

coefficients. ADHD, BI, parental anxiety and peer victimization increased the risk of anxiety disorders at age 6, but social skills decreased the risk. Whereas, ADHD predicted reduced social skills, parental anxiety, and BI predicted increased peer victimization. However, these indirect effects on anxiety disorders were not significant.

Moderation analyses revealed a significant interaction term between parental anxiety and BI, standardized estimate = −.12, $p = .008$. To illuminate the nature of the interaction, BI was divided into three groups, one scoring below 1 SD of the mean, one ±1 SD of the mean, and one group scoring 1 SD above the mean. Multigroup analysis of the depicted model revealed that parental anxiety increased the risk of anxiety disorders among children with high BI, $\beta = .26$, $p = .02$ and moderate BI, $\beta = .14$, $p = .04$, but not among children low on BI, $\beta = −.13$, $p = .36$.

Discussion

The present study investigated, for the first time, risk and protective factors for future anxiety disorders in

a community sample of preschoolers. More specifically, it built upon and extended prior research in a number of ways – by adjusting for initial anxiety disorders and other common disorders, by using a representative community as opposed to the extreme group approach, and by relying on a diagnostic interview to measure anxiety disorders. Results indicated that elevated levels of BI, ADHD, parental anxiety, and peer victimization, along with low scores on social skills at age 4, significantly predicted anxiety disorders at age 6. Children low on BI, however, were protected from the detrimental effect of parental anxiety.

Etiological theories of social anxiety propose that avoiding unfamiliar situations may lead some individuals to perceive such situations as threatening and uncontrollable, thereby increasing the risk for developing anxiety (Clark & Wells, 1995). Lack of social skills may prevent children from interacting with other children and unfamiliar adults, thus increasing the risk of anticipated failure and ridicule. Evidence concerning a social-skills-deficit explanation versus a cognitive-distortion explanation of the link between low-social skills and anxiety remains mixed, but findings from research on older children and adolescents indicate that both deficiency and distortions may be involved (Miers, Blote, & Westenberg, 2011). Results of the present study indicate that poor social skills, as evaluated by day-care teachers, predicted anxiety disorders in young children. This does not, however, rule out the possibility that negative self-evaluations (i.e. cognitive distortions) may add to the risk of developing anxiety.

Peer victimization and anxiety correlate (Hawker & Boulton, 2000). Our results are in accordance with research showing that bullying takes place in preschool (Vlachou, Andreou, Botsoglou, & Didaskalou, 2011) and that preschool psychiatric disorders and victimization co-occur (Belden et al., 2012), but advances understanding by showing that bullying increased the risk of developing an anxiety disorder. Children who are anxious, inhibited and lacking in social competence, particularly assertiveness, are less likely to competently tackle bullying attempts, and may thereby by more likely to be victimized (Olweus, 1994). Because anxiety, social-skills deficiencies, and peer victimization are related (Crawford & Manassis, 2011), it has been difficult to disentangle their respective effects. Notably, then, current findings indicate that peer victimization forecast future anxiety over and beyond victims' social-skills deficiencies and BI.

Early emerging behavioral disorders, i.e. ODD and CD, tend to predict later depression (Boylan, Vaillancourt, & Szatmari, 2012; Chronis-Tuscano et al., 2010). The present study suggests that with respect to anxiety disorders, ADHD may be the important disruptive disorder to consider. Although ADHD did predict later anxiety disorders, it is premature to draw causal inferences, not least because common risk factors could explain the association, including other disorders and temperamental dispositions (Lilienfeld, 2003). These particular alleged 3rd variables were adjusted for in the current study. Others have investigated the possibility that parenting practices and peer rejection could mediate the effect of ADHD on anxiety (Baldwin & Dadds, 2008), but no such effect was observed. Thus, in contrast to previous studies on older children unique effects of ADHD on later anxiety disorder remained even after adjusting for potential confounders, alleged mediators, and concurrent anxiety disorder.

Results presented concerning parental anxiety and BI are in line with previous research on preschool-age predictors of young-children's anxiety disorders (Hudson et al., 2011) which replicated related findings for older children (Biederman et al., 2001; Muris et al., 2011) and on rating-scale scores of young children's anxiety (Kerns et al., 2011). It has been proposed that the effect of parental anxiety may work via increased levels of BI in the offspring, mediated through genetic transmission, modeling or other types of anxiogenic socialization practices (Murray et al., 2009). The present findings, however, suggest that parental anxiety and BI have partly uniquely direct effects on later anxiety disorders. Moreover, the fact that parenting did not predict anxiety disorders implies that it is not via hostile, intrusive or insensitive parenting that such genetic effects might be mediated. Recall, too, that it was only among those with moderate or high levels of BI for whom parental anxiety increased the risk of future anxiety disorders, and this interaction effect was also detected in Hudson et al.'s (2011) rating-scale study. The reasons why children low on BI are protected against the impact of parental anxiety is by no means clear. Possibly, their lacking inhibition will increase their social network and thus the input these children receive from peers and other adults, including how to interpret and behave in potentially threatening situations. This alternate input may make these children less vulnerable to their anxious parent's modeling of avoidance behavior, threat-perception and aspects of anxious rearing styles not captured in the present study.

Conceptually, there may be considerable overlap between BI and anxiety, raising questions about the distinctiveness of the two constructs (Rapee & Coplan, 2010). The low correlation between them detected here, coupled with their items loading on separate factors, reveals limited overlap. Moreover, finding that BI at T1 predicts later anxiety disorder even after adjusting for concurrent anxiety disorder at T1 lends further support to the view that the two constructs at least partly differ and that the repeatedly reported predictive value of BI in follow-up studies of young children is not merely a reflection of co-occurring, but often unmeasured, anxiety.

A variety of risk factors hypothesized here to be related to children's anxiety failed to distinguish

clinically anxious children from others. Notably, there was no stability in anxiety disorders, but a modest stability in number of anxiety disorders and number of anxiety disorder symptoms. The previously reported stability coefficients of anxiety in children tend to be considerably higher when parent-completed rating scales are involved than when disorders based on clinical interviews with independent raters across time points are used (Hudson et al., 2011). Thus, the high stability in parent-reported rating scale scores of anxiety may in part reflect stability in parents and not only in children's anxiety. One study from the United States reported modest stability in number of anxiety disorders from age 4 to age 6, as we did (Hudson et al., 2011), but another US study also found stability in anxiety disorder diagnoses from age 3 to 6 (Bufferd, Dougherty, Carlson, Rose, & Klein, 2012). Specific phobias were the most prevalent anxiety disorder, but this decreased from preschool to first grade. The lacking stability in anxiety disorders, as opposed to symptoms or number of disorders, might in part be attributed to this decline – and perhaps instability in such fears. Moreover, we have previously shown that rates psychiatric disorders, also for anxiety disorders, are 3–4 times lower in Norway than in the United States (Wichstrøm et al., 2012). This lower prevalence and the presently observed low stability may in part be caused by possibly shorter duration of disorders in young children in Norway.

Parenting, measured either through child report or observationally, also did not predict anxiety disorders. One previous study among preschoolers found a very weak effect of parental overinvolvement on anxiety (Edwards et al., 2010), whereas another failed to discern such an effect (Hudson et al., 2011). The current research certainly suggests that parenting may be of less importance than commonly thought (Rapee et al., 2009).

The fact that insecure attachment was not prospectively related to anxiety disorders contrasts with the results of a recent meta-analysis, which discerned a significant, albeit small, longitudinal effect size among older children (Colonnesi et al., 2011). We note that other studies using anxiety disorders in early childhood have also failed to detect such an association (Hudson et al., 2011). It could be the case that the children studied were still too young for insecurity to predict anxiety. Consistent with such speculation is recent evidence that attachment security failed to predictive anxiety in kindergarten, but did so when anxiety was measured 6 years later (Kerns et al., 2011).

Although the present study had many strengths, several limitations should be considered when interpreting the findings. First, diagnosis was based on interview with one parent only. It is possible that the prevalence of anxiety disorders and their predictors would have been different had both parents' and preschool teachers' perspectives been taken into account. Moreover, due to power considerations, anxiety disorders were combined. Risk and protective factors may differ for the different anxiety disorders (Muris et al., 2011) and future studies should therefore include a larger number of anxious children to differentiate between anxiety disorders. Although being a prospective study, distal factors and mediating factors were measured at the same time point and therefore the causal ordering of variables was based on theory. We cannot thus conclude that mediating variables did not influence distal variables, e.g. social skills causing ADHD, but considering the hypothesized etiology of ADHD it seems less likely than the opposite ordering of cause and effect. The present study was conducted on young children and only with a 2-year follow up. Hence, there is a definite need for replications, also with extended follow-up before any generalizations can be done. It should also be noted that some of the instruments used had moderate reliability, most notably MCAST and EA, and this may have reduced the capacity of attachment and parenting, respectively, to predict anxiety disorders. BI was measured by parent report and one might therefore suspect the association between parent-reported anxiety disorders and BI to be partly caused by common method variance. However, such confounding would be expected to be stronger with respect to the concurrent relationship between the two constructs than with the prospective relationship. As it turned out the correlation between concurrent BI and anxiety was very low. Using parents as informants for both BI and anxiety was therefore in all likelihood not a major source of confounding. Further, results may not generalize to societies where the prevalence of anxiety disorders, risks and protective factors are different, to say nothing about other differences between Norway and other locales (e.g. national health service).

In conclusion, a range of risk and protective factors relating to the child, parents and peers at age 4 years predicted anxiety disorders at age 6 in the community. Specifically, BI, ADHD, parental anxiety, and bullying by peers served as risk factors, whereas social competence protected against anxiety disorders. These findings underscore the need for directing preventive and treatment efforts toward reducing bullying in preschool; social skills training may also be warranted in young children. Effective treatment of young children's ADHD may prevent the emergence of anxiety disorders, as may treatment of parental anxiety and helping anxious parents to encourage exploratory behavior in inhibited children.

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Key points

- Anxiety disorders are present already in the preschool and early school age, but research on potential risk and protective factors in this age group has been scant and has only applied an extreme group design. BI, previous anxiety disorders and parental anxiety have been suggested as risk factors in this research.
- The present study reports from a large population-based sample of Norwegian 4-year olds followed up at first grade which examined a wide set of predictors.
- Behavioral inhibition, parental anxiety, ADHD, peer victimization, and low social skills during the preschool age have unique effects on anxiety disorders in first grade.
- Treating ADHD and parental anxiety, preventing bullying and launching efforts toward increasing social skills in preschoolers may reduce the risk of children developing anxiety disorders.

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