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Prevalence and course of anxiety disorders and symptoms from preschool to adolescence: a 6-wave community study

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Background: The rate of various anxiety disorders in early childhood and whether they continue into middle childhood or adolescence is not known. We therefore report on the prevalence and stability of DSM-5-defined anxiety disorders and their symptoms, capturing the period from preschool to adolescence. **Methods:** By means of interviewer-based clinical interviews, anxiety was measured in a sample of Norwegian children at six measurement points from age 4 to 14 (n = 1,041). To adjust for time-invariant factors, we applied random intercept cross-lagged panel models (RI-CLPMs) capturing within-person changes. **Results:** Nearly 10% (95% CI = 7.29, 12.63) had an anxiety disorder at some timepoint. Specific phobia was the most prevalent disorder in early and middle childhood, whereas generalized anxiety disorder (GAD) increased in prevalence and became the most common anxiety disorder at age 14 (4.51%, 95% CI = 2.78, 6.23). When time-invariant confounding was adjusted for, homotypic continuity in anxiety symptoms typically first emerged in late middle childhood or adolescence. Even so, such within-person analyses revealed a heterotypic path from increased number of early childhood symptoms of specific phobia to increased number of GAD symptoms in middle childhood (B = .41, 95% CI = .06, .75). Increased separation anxiety in middle childhood predicted increased symptoms of GAD in adolescence (B = .38, 95% CI = .14, .62), and *vice versa* (B = .05, 95% CI = .00, .09). Only minor gender differences were revealed. **Conclusions:** Anxiety disorders are prevalent in childhood. In early childhood, anxiety symptoms generally do not predict later anxiety symptoms. In middle childhood, however, such symptoms are less likely to vanish, indicating this developmental period to be particularly important for preventive and treatment efforts. **Keywords:** Anxiety; continuity; development; longitudinal studies; prevalence; stability.

Introduction

Anxiety disorders are common in childhood and adolescence (Finsaas, Bufferd, Dougherty, Carlson, & Klein, 2018; Merikangas et al., 2010). To aid policy, planning, prevention, and treatment, information concerning the natural course and prevalence of the various anxiety disorders is needed. Such information is available from middle childhood onwards (Copeland, Angold, Shanahan, & Costello, 2014; Merikangas et al., 2010). However, anxiety disorders have already manifested in preschool and the early school years (Egger & Angold, 2006; Wichstrøm et al., 2012), indicating a need for early intervention. At present, we do not know the rate of various anxiety disorders in early childhood or whether they continue into middle childhood or adolescence. We will therefore, for the first time, report on the prevalence and stability of DSM-5-defined anxiety disorders in the community, capturing the period from preschool to adolescence and applying interviewer-based clinical interviews.

Studies of older children and adolescents have reported that anxiety disorders differ with regard to age of onset (de Lijster et al., 2017), prevalence (Merikangas et al., 2010), and trajectory (Copeland et al., 2014). Retrospective reports have suggested that the median age for anxiety disorder onset is in the early school years (Merikangas et al., 2010), thus many children had likely already developed an anxiety disorder, or symptoms thereof, when they were enrolled in the abovementioned studies. As pointed out by Cohen, Andrews, Davis, and Rudolph (2018), longitudinal research on anxiety has mainly captured childhood *or* adolescence, not both. To gain insight into the development of anxiety, longer-term studies capturing the transitions between developmental phases (i.e., preschool to school age, middle childhood to adolescence) are needed.

Stability of symptoms and disorders may be divided into homotypic (same disorder) and heterotypic (cross-disorder) forms. Morken, Viddal, Ranum, and Wichstrom (2020) identified five different meanings of the term 'stability' with differing implications for intervention, of which we address three: (a) *stability relative to the group* (i.e., 'rank order' correlation); (b) *stability relative to oneself* (i.e., intraclass correlation); and (c) *stability of within-person changes*. The first has to some extent been addressed in previous research, whereas the latter two have not been examined before.

Stability in the number of symptoms has traditionally been assessed by Pearson's correlations (stability relative to the group), which measure the

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extent to which a child's anxiety score relative to others' anxiety scores covary over time. However, for a clinician, and especially when the prevalence of anxiety changes during development, it is arguably more pertinent to know the extent to which a specific child is expected to be equally anxious in the future – that is, stability relative to oneself. Interest in the stability of anxiety disorders stems in part from the prospect that earlier anxiety impacts later anxiety, for example, through evasion of the feared situation or object negatively reinforcing avoidance behavior and thereby maintaining anxiety. However, it is also possible that fear-inducing situations or vulnerabilities (e.g., genetics) endure and cause persistent anxiety; thus, stability in anxiety may potentially be due to time-invariant factors. Hence, determining whether increased anxiety predicts future increases in anxiety when adjusting for time-invariant factors is critical to treatment and prevention and will – to our knowledge – be investigated for the first time here.

Finally, to capture the breath of information needed for a diagnosis (i.e., severity, frequency, onset, duration of symptoms, and resulting distress and impairment), clinical interviews are typically needed. Essential parts of this information are usually lacking in questionnaires and checklists, which may be one reason why the results from checklists correspond only modestly with diagnoses established by interviews (Sveen, Berg-Nielsen, Lydersen, & Wichstrom, 2013). However, only a few longitudinal community studies have used such interviews to measure anxiety disorders. Our knowledge of the prevalence and course of anxiety disorders is therefore limited. Of note, subthreshold anxiety often precedes full-blown disorders (Fergusson, Horwood, Ridder, & Beautrais, 2005) and may cause impairment and increase the risk for comorbid psychiatric symptoms (Balazs et al., 2013). Therefore, population-based estimates at the symptom level are needed and will be included here. In sum, we will (a) provide data on the prevalence of different anxiety disorders from preschool to adolescence, and (b) estimate three types of homotypic and heterotypic stability of anxiety disorder symptoms: (a) stability relative to the group; (b) stability relative to oneself, and (c) stability of within-person changes.

Method

Participants and procedure

Before the routine health check-up for children at 4 years of age, parents of the 2003 and 2004 birth cohorts in Trondheim (N = 3,456), Norway, received a letter of invitation to participate in the Trondheim Early Secure Study (TESS) (Steinsbekk & Wichstrøm, 2018). The Strengths and Difficulties Questionnaire (SDQ) version 4-16 (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000), a screening assessment for emotional and behavioral problems, was sent together with the invitation letter, and the parents brought the completed SDQ when they attended the well-child clinic. Almost all children presented at the check-up (97.2%; Figure S1). Parents were informed about the TESS study by the health nurse, using procedures approved by the Regional Committee for Medical and Health Research Ethics, Mid-Norway. The health nurse also obtained written participant consent.

To increase variance and thus statistical power, children were allocated to four strata according to their SDQ scores (cutoffs: 0–4, 5–8, 9–11, and 12–40), and the probability of selection increased with increasing SDQ scores (0.37, 0.48, 0.70, and 0.89 in the four strata, respectively). Table S1 displays the characteristics of the TESS participants, who had a mean age of 4.4 (SD = .21), 6.7 (SD = .17) (2009-2010), 8.8 (SD = .24) (2010–2020, 10.5 (SD = .15), 12.5 (SD = .15), and 14.4 years (SD = .16) at the six measurement points. Anxiety, gender, and socioeconomic status did not predict drop-out at any time point. Data were collected at the university clinic, and each wave of data took two years to complete (T1: 2007–2008; T2: 2009–2010; T3: 2011–2012, T4: 2013–2014; T5: 2015–2016; T6: 2017–2018). The sample, weighted back to adjust for the oversampling just described, is comparable to the Norwegian parent population of 4-year-olds for the parents' level of education (Statistics Norway, 2012).

Measures

Anxiety symptoms and disorders were measured by the Preschool Age Psychiatric Assessment (PAPA) (Egger et al., 2006) at ages 4–6 years and by the Child and Adolescent Psychiatric Assessment (CAPA) (Angold & Costello, 2000) at ages 8–14 years. The PAPA is a parent-only version, whereas for the CAPA, parents and children are interviewed separately. Interviewers posed mandatory and optional follow-up questions until they had enough information to decide whether a symptom was present at predetermined severity thresholds (with regard to intensity, frequency, and duration) using a 3-month primary period. A symptom was considered present if reported by either child or parent. Using a continuous approach, the number of DSM-5-defined symptoms for each anxiety disorder, namely generalized anxiety disorder (six symptoms, ICC = .86), social anxiety (two symptoms, ICC = .78), specific phobias (four symptoms referring to types: fear of animals, blood/injection/injury, situational [e.g., elevators], and other [e.g., costumed characters, loud sounds, choking]; ICC = .62) and separation anxiety (eight symptoms, ICC = .82), were summed. In accordance with the DSM-5, significant distress or impairment from anxiety was included as a diagnostic criterion. Audiotapes of 336 cases were recoded by blinded coders.

Statistical analysis

Analyses were performed in Mplus, version 8.3 (Muthén & Muthén, 1998–2017). To arrive at corrected population estimates due to oversampling, we applied probability weights corresponding to the number of children in each stratum divided by the number of participants in the same stratum. A full information maximum likelihood procedure was used to handle missing data. Increases or decreases in the prevalence of disorders and the number of symptoms per year were calculated by latent growth modeling.

Two-year stability and stability between developmental periods in anxiety symptoms were estimated in several steps and by different approaches. First, two-year *stability relative to the group* ('rank order') was estimated by Pearson's correlations. Second, two-year *stability relative to oneself* was estimated using intraclass correlation (ICC), which represents the proportion of the total variance attributable to between-person variance. Third, to test homotypic continuity between developmental periods as well as heterotypic continuity over and

beyond the impact of homotypic continuity, sum scores of symptoms in early childhood (symptoms at ages 4 and 6 aggregated), middle childhood (ages 8 and 10), and adolescence (ages 12 and 14) were computed. Cross-lagged panel models (CLPMs) were then estimated. Finally, to assess *stability of within-person changes* and thus adjust for time-invariant factors, we drew upon random intercept models (RI-CLPMs) capturing within-person changes (Hamaker, Kuiper, & Grasman, 2015), using children as their own controls. The Satorra–Bentler scaled chi-square test (Satorra & Bentler, 2001) was used to examine gender and age differences. Two-sided *p*-values <.05 are regarded as statistically significant. However, due to testing of multiple research questions, *p*-values between .01 and .05 should be interpreted with caution.

Results

Prevalence of anxiety disorders

Specific phobia was the most prevalent disorder in early and middle childhood, whereas GAD increased in prevalence and became the most common anxiety disorder at age 14 (4.5%) (Figure 1; details in Tables S2 and S3).

In the transition from preschool to primary school, GAD and separation anxiety increased (Table S3: Age 4 vs. age 6), whereas when entering middle childhood (age 8–10 years), specific phobia and social anxiety disorder increased – as did separation anxiety, once more. GAD, social anxiety disorder, and specific phobia all increased linearly in prevalence, and curvilinear changes were detected for GAD and social anxiety (Figure 1 and Table 1).

Only a few gender differences in prevalence emerged (Table S2): Boys were more likely than girls to have GAD at age 6 (boys: 1.2%; girls: 0.2%), whereas at age 14, the prevalence of GAD was nearly three times higher for girls than boys (6.5% vs. 2.3%, respectively). Social anxiety disorder was also more prevalent in girls (2.4%) than in boys (0.7%) at age 14, and the same was evident for specific phobias (girls: 5.5%; boys: 2.0%). This gender difference was also reflected in higher prevalence of any anxiety disorder (i.e., having at least one diagnosis) at age 14 in girls compared to boys. Growth rates were not gender specific.

In all, 9.96% (95% CI = 7.29, 12.63) had an anxiety disorder at some timepoint, and the gender difference was insignificant (girls: 11.53%, CI = 7.52, 15.53; boys: 8.23%, 95% CI = 4.78, 11.67, $\Delta\chi^2 = 1.50$, $df = 1$, $p = .220$). The disorder-specific rates were as follows: GAD: 7.58% (CI = 5.23, 9.94; girls: 8.88%, CI = 5.42, 12.34; boys: 6.11%, CI = 2.97, 9.25); social anxiety: 3.12% (CI = 1.69, 4.56; girls: 3.97%, 95% CI = 1.69, 6.25; boys: 2.15%, CI = 0.54, 3.77); specific phobia: 7.75% (CI = 5.37, 10.14; girls: 9.59%, CI = 5.85, 13.33; boys: 5.72%, CI = 2.91, 8.53); and separation anxiety: 2.17%, CI = .85, 3.49; girls: 1.10%, CI = 0.02, 2.19; boys: 3.39%, CI = 0.87, 5.92). Please note that separation anxiety at age 4 and specific phobia at age 6 could not be estimated in the gender specific analyses and are therefore not included in the gender specific estimates. No gender differences in these overall prevalence (i.e., having the specific disorder at least once between ages 4 and 14 years) were found, except for separation anxiety ($\Delta\chi^2 = 4.95$, $df = 1$, $p = .026$).

Growth in symptoms

The mean number of GAD symptoms increased linearly by .08 symptoms per year – reaching its peak at age 10 and leveling off thereafter. There was a slight increase in social phobia symptoms, whereas a yearly decline of .02 separation anxiety symptoms was detected (Table S4).

Homotypic continuity in anxiety symptoms

Stability relative to the group was evident for all symptoms with two exceptions: specific phobia at age 4 and social anxiety age 8 were uncorrelated with the same symptoms two years later (Table S5). Note

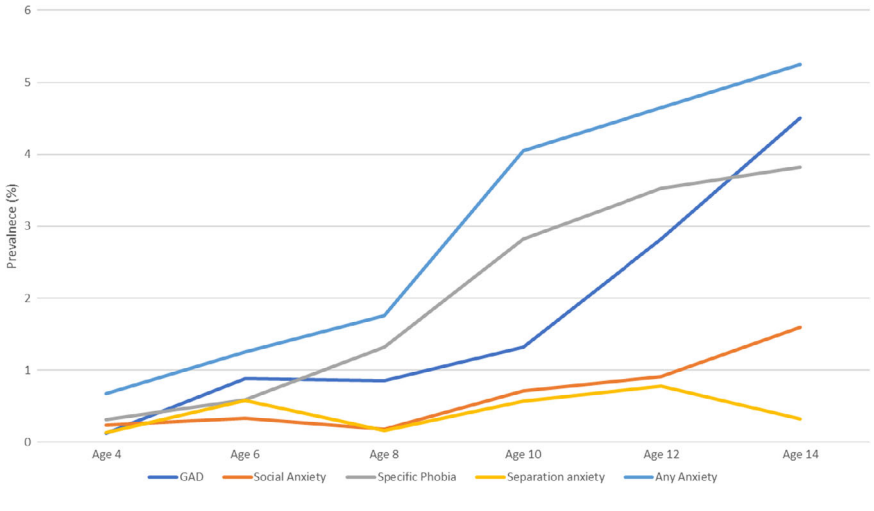

Figure 1 Prevalence of anxiety disorders from age 4 to 14 years. *Note*: Prevalence estimates (% and 95% CI) stratified by gender and age are displayed in Supporting Information (Tables S2 and S3, respectively)

Table 1 Yearly growth in percentage of anxiety disorders from age 4 to 14 years

	Slope		Quadratic slope	
Disorder	Mean (95% CI)	*p*	Mean (95% CI)	*p*
GAD	0.30 (0.19, 0.041)	<.001	0.04 (0.00, 0.07)	.026
Social Anxiety	0.08 (0.02, 0.14)	.007	0.02 (0.00, 0.04)	.031
Specific phobia	0.37 (0.26, 0.48)	<.001	0.02 (−0.02, 0.06)	.304
Separation anxiety	0.03 (−0.03, 0.09)	.737	0.0 (−0.02, 0.02)	.842
Any Anxiety Disorder	0.45 (0.33, 0.62)	<.001	0.03 (−0.02, 0.07)	.205

that due to the infrequency of social anxiety symptoms (see Table S4), stability involving the first two time lags (age 4–6 years and age 6–8 years) could not be estimated, but social anxiety symptoms evinced moderate stability from age 10 to 12 (r = .38, 95% CI = .18, .58, $p \leq .001$) and 12to 14 years (r = .36, 95%CI = .18, .55, $p \leq .001$) (Table S5). Symptoms of GAD evinced stability between all time points, ranging from low (r = .12, 95%CI = .03, .21, p = .011) to high estimates (r = .46, 95%CI = .36, .55, $p \leq .001$) (Table S5). Symptoms of separation anxiety also displayed stability (ranging from r = .15 (95% CI = .06, .26, p = .002) to r = .28 (95%CI = .06, .48, p = .010)) as did symptoms of specific phobia (ranging from r = .23 (95%CI = .07, .40, p = .006) to r = .26 (95%CI = .12, .41, $p \leq .001$)), with the exception of age 4-6 (r = .03 (95%CI = −.06, .11, p = .503). In general, the stability from age 4 to 6 was low and lower than at later ages. Symptoms of GAD (β = .32, $p \leq .001$), separation anxiety (β = .17, p = .009), and specific phobia (β = .19, p = .004) demonstrated some continuity from early (symptoms in 4- and 6-year-olds aggregated) to middle childhood (8 and 10 years). This was also the case from middle childhood to adolescence (12 and 14 year; GAD: β = .38, $p \leq .001$; separation anxiety: β = .31, $p \leq .001$; specific phobia: β = .12, p = .01) (Table 2). No stability was found from early childhood to adolescence, and these paths are therefore not displayed.

The overall stability of symptoms *relative to oneself* across all ages was ICC = .28 (CI = .24–.31). ICCs for each type of anxiety and for each age transition are presented in Table S5. Overall, the stability was somewhat similar across disorders. There was also a tendency toward higher 2-year stability by increasing age for symptoms of all disorders, although not consistently so.

As seen in the RI-CLPM results in Table 2, stability when *time-invariant confounding was adjusted for* typically emerged in late middle childhood (separation anxiety: β = .16, p = .03) or adolescence (GAD: β = .33, $p \leq .001$; separation anxiety: β = .30, p = .005). A model where age 10-12 and 12-14 stabilities was set to be equal but allowed to be different from age 4 to 6, 6 to 8, and 8 to 10 stabilities provided better fit than when all stabilities were set to be equal with respect to any anxiety ($\Delta\chi^2$ = 10.56, df = 1, p < .001), generalized anxiety ($\Delta\chi^2$ = 13.31, df = 1, p < .001), specific phobias ($\Delta\chi^2$ = 7.41, df = 1, p = .007), and social phobia ($\Delta\chi^2$ = 6.72, df = 1, p = .010), but not for separation anxiety ($\Delta\chi^2$ = .51, df = 1, p = .48); these data indicated that the stability was higher in the latter period than when the participants were younger. Moreover, the stability in late middle childhood and adolescence was most similar to the unadjusted correlations (Table S5), whereas a seemingly greater discrepancy between associations when time-invariant confounding was and was not adjusted for was seen in early childhood, implying that the observed stability of anxiety symptoms at earlier ages could be attributed to a greater extent to underlying time-invariant factors than at later ages.

Heterotypic continuity in anxiety symptoms

Note that heterotypic paths to or from social anxiety symptoms could not be estimated due to the low number of symptoms (see Table S4). An ordinary CLPM portrayed GAD symptoms in middle childhood to forecast symptoms of separation anxiety in adolescence (β = .12, p = .02), and *vice versa* (β = .13, p = .002) (Table 2: CLPM results), whereas early childhood symptoms of specific phobia predicted symptoms of GAD in middle childhood (β = .09, p = .03). When time-invariant confounders were adjusted for (Table 2: RI-CLPM results), most effects in the CLPM from middle childhood to adolescence were retained. Increased separation anxiety in middle childhood predicted more symptoms of GAD in adolescence (β = .14, p = .002) –and *vice versa* (β = .12, p = .02), and more symptoms of specific phobia in early childhood predicted increased GAD in middle childhood (β = .11, p = .02), an effect that was indirectly carried forward to more GAD in adolescence (mediation effect: B = .14, CI: .00, .27, p = .047) through the stability in GAD from middle childhood to adolescence.

Discussion

Accurate epidemiological data are needed to guide public policy, planning, prevention, and treatment of pediatric anxiety, but such data are scarce. By means of psychiatric interviews, the present study therefore examined the prevalence and three types of stability of DSM-5 defined anxiety in a representative

Table 2 Homotypic and heterotypic paths between symptoms of anxiety disorders from early to middle childhood and adolescence. Cross-lagged panel model and random intercept cross-lagged panel model results

	GAD symptoms			Separation anxiety symptoms			Specific phobia symptoms		
	Middle Childhood			Middle Childhood			Middle Childhood		
Early childhood	*B* (95% CI)	*p*	*β*	*B* (95% CI)	*p*	*β*	*B* (95% CI)	*p*	*β*
GAD:CLPM	.54 (.36, .71)	<.001	.32	.03 (−.04, .10)	.39	.04	.07 (−.00, .13)	.06	.12
GAD:RI-CLPM	.33 (−.11, .78)	.14	.17	.01 (−.15, .16)	.95	.01	.06 (−.04, .16)	.24	.12
SEP:CLPM	.12 (−.03, .27)	.10	.07	.14 (.04, .24)	.009	.17	.03 (−.03, .10)	.29	.06
SEP:RI-CLPM	.15 (−.02, .32)	.08	.09	.13 (.01, .26)	.03	.16	.03 (−.03, .08)	.32	.06
PHO:CLPM	.31 (.04, .58)	.03	.09	.05 (−.06, .16)	.33	.04	.21 (.07, .35)	.004	.19
PHO:RI-CLPM	.41 (.06, .75)	.02	.11	.11 (−.12, .34)	.36	.06	.01 (−.11, .13)	.86	.01
	Adolescence			Adolescence			Adolescence		
Middle childhood	*B* (95% CI)	*p*	*β*	*B* (95% CI)	*p*	*β*	*B* (95% CI)	*p*	*β*
GAD:CLPM	.46 (.35, .58)	<.001	.38	.05 (.01, .09)	.02	.12	.04 (.01, .07)	.007	.14
GAD: RI-CLPM	.42 (.29, .55)	<.001	.33	.05 (.00, .09)	.04	.12	.04 (.01, .07)	.01	.15
SEP:CLPM	.37 (.14, .60)	.002	.13	.28 (.13, .43)	<.001	.31	.02 (−.05, .09)	.53	.04
SEP:RI-CLPM	.38 (.14, .62)	.002	.14	.25 (.07, .42)	.005	.30	.02 (−.06, .09)	.66	.03
PHO:CLPM	.02 (−.30, .34)	.89	.01	.04 (−.06, .15)	.41	.04	.10 (.02, .18)	.01	.12
PHO:RI-CLPM	.26 (−.28, .80)	.35	.05	.10 (−.08, .27)	.28	.06	.11 (−.03, .25)	.11	.10

GAD, generalized anxiety disorder; SEP, Separation anxiety; PHO, specific phobia; CLPM, cross-lagged panel model; RI-CLPM, random intercept cross-lagged panel model; Early childhood: symptoms at ages 4 and 6 aggregated; Middle childhood: symptoms at ages 8 and 10 aggregated; Adolescence: symptoms at ages 12 and 14 aggregated. Homotypic and heterotypic paths to/from social anxiety disorder symptoms could not be estimated due to the low number of symptoms (see Table S4).

community sample of Norwegian children biennially assessed from age 4 to 14 years. We revealed that specific phobia and GAD were the most prevalent anxiety disorders, both increasing with increasing age, whereas separation anxiety and social anxiety disorders were relatively rare. Stability in anxiety symptoms relative to the group and relative to oneself ranged from low to high. Whereas some stability was observed between symptoms in early and middle childhood and between middle childhood and adolescence, there was no continuity between symptoms in early childhood and adolescence. Of note, the homotypic stability of symptoms of anxiety disorders when all time-invariant confounding was adjusted for were present from middle childhood, not before. However, increased specific phobia in early childhood predicted increased GAD in middle childhood, and there were reciprocal heterotypic relations between increased separation anxiety and increased GAD from middle childhood to adolescence, over, and beyond the homotypic stability.

Prevalence of anxiety disorders

Nearly one in ten children fulfilled the criteria for an anxiety diagnosis at least once between 4 and 14 years, which is in the lowest range of previously reported rates. In their review, Beesdo, Knappe, and Pine (2009) report a lifetime prevalence of 15-20% in studies of children and adolescents, Costello, Egger, Copeland, Erkanli, and Angold (2011) found an estimate of 12.3% in childhood and 11% in adolescence, whereas Finsaas et al. (2018) reported the following rates: age 3: 19.1%; age 9: 22.1%; age 12: 22.1%. The comparatively low overall rate found in the present inquiry is likely due to the low prevalence of anxiety before age 10, moderately high prevalence at ages 10-14 combined with moderately high stability from age 10, thus limiting incident cases. With respect to individual diagnoses, specific phobia was the most prevalent disorder in this age span, whereas Copeland et al. (2014) reported GAD to be the most common disorder during their study period. This discrepancy can be explained by the fact that the latter investigation captured the span of ages from 9 to 26 years. As also found in the present inquiry, GAD was the most prevalent disorder from adolescence onward. Of note, however, the current prevalence rates for the various disorders were lower compared to those found in some previous studies, for example, The Great Smokey Mountain Study: 9- to 12-year-olds: separation anxiety: 4%–5% (Copeland et al., 2014); Spence, Zubrick, and Lawrence (2018): yearly estimate 4- to 17-year-olds: social anxiety: 2.3%; separation anxiety: 4.3%; GAD: 2.2%. It should also be noted that the overall prevalence of psychiatric disorders in Norwegian children is lower compared to US estimates (Heiervang et al., 2007; Wichstrøm et al., 2012).

Age differences in the prevalence of anxiety disorders. Generalized anxiety disorder and separation anxiety increased from preschool to school age, whereas social anxiety and specific phobia did not. The transition from day care to school (age 6 in Norway) may imply unfamiliarity and/or ambiguity,

which can trigger feelings of potential danger or threat and thus anxiety (Nelemans, Hale, Branje, Meeus, & Rudolph, 2018). Starting school also entails the breaking of social ties to day-care teachers and peers, which may trigger separation anxiety and GAD and thus explain why these are the two anxiety disorders that increase during this transition. Furthermore, bullying, a known risk factor for anxiety disorders (Wichstrøm, Belsky, & Berg-Nielsen, 2013), may increase when starting school.

When entering middle childhood (age 8–10 years), our participants showed higher rates of specific phobia, social anxiety, and separation anxiety. Attaining autonomy is a core developmental task from middle childhood and throughout adolescence, while friendships and peer relations become stronger and more complex, and academic challenges are increasing. Although most children deal successfully with these developmental tasks, some may feel overwhelmed and begin to doubt their efficacy in dealing with this novelty (Muris, 2002); hence, those who use avoidance as a coping mechanism are more likely to develop anxiety. Such an assumption is supported by a study showing that youth who displayed more anxiety after the transition to middle school reported more transition-related stressors and reduced relationship quality with friends and parents than those with a decreasing anxiety trajectory (Nelemans et al., 2018).

Gender differences in the prevalence of anxiety disorders. We found very small gender differences in prevalence rates in the childhood years, but at age 14, girls were more likely than boys to have GAD, specific phobia, and social anxiety disorder. This is consistent with previous research, showing that until late middle childhood, gender differences hardly exist, whereas between ages 13 and 15, the gender disparity in emotional disorders is fully established (Nelemans et al., 2018). Although a range of biological (e.g., puberty), psychological (e.g., regulation capacities), and social factors (e.g., social exclusion) have been suggested to explain why there is this female preponderance that emerges in early adolescence, there are few answers.

Homotypic continuity of anxiety symptoms

When all time-invariant confounding was adjusted for, homotypic stability of within-person changes typically first emerged in late middle childhood and adolescence, whereas a seeming continuity in GAD and specific phobia from early to middle childhood could be attributed to such time-invariant factors. Although time-varying factors could be operative, these findings are consistent with a scar effect of anxiety in middle childhood, possibly through negative reinforcement of avoidance behavior. Preventive efforts in middle childhood might therefore have longer-term effects, whereas symptom reduction at earlier ages might have less sustainable impact.

Heterotypic continuity of anxiety symptoms

Within-person analyses revealed that specific phobia symptoms in early childhood predicted increased symptoms of GAD in middle childhood. From middle childhood to adolescence, increased GAD predicted increased specific phobia, whereas increased separation anxiety symptoms predicted more symptoms of GAD, and vice versa. According to Weems's developmental model of continuity and change of anxiety symptoms (2008), core features of anxiety (i.e., dysregulation, negative affect/distress) are fairly stable during childhood, whereas disorder-specific symptoms are shaped by normative challenges (e.g., starting school). This may explain why children displaying specific phobia symptoms in early childhood are likely to show GAD symptoms in middle childhood, where developmental demands (e.g., increasing academic demands) may result in specific anxiety expressions decreasing (e.g., fear of dogs) while a more general characteristic of worrying is adopted. This assumption is supported by a Swedish study (Ahlen & Ghaderi, 2020) which indicated that broad anxiety is expressed as separation anxiety in younger ages but as generalized anxiety at later ages. We add to this by showing separation anxiety to forecast later GAD symptoms even when time-invariant confounders are accounted for. Moreover, those who develop symptoms of GAD during middle childhood not only continue to evince GAD symptoms during adolescence but also evince symptoms of specific phobia and separation anxiety. It is possible that the broad-scale worrying typical of GAD also becomes fixed on specific objects (phobia) and parental figures (separation). Irrespective of etiological issues, the heterotypic continuity net of time-invariant confounding identified herein suggests that early effective treatment of a specific anxiety might generalize to reducing other anxieties.

Strengths and limitations

Although the current inquiry had many strengths, including prospectively following a representative community sample spanning six waves of data from preschool to adolescence, the use of semistructured psychiatric interviews to capture DSM-5-defined anxiety, and a strong statistical approach to identify the stability of symptoms of anxiety disorders, we acknowledge some limitations. We interviewed both participants and parents from age 8 onwards, but only parents in the first two waves. Although including two informants is indeed a strength, especially since parents may not be aware of some anxieties (Grills & Ollendick, 2003), having two reporters may result in higher prevalence rates than having parent reports only. However, as the prevalence did not

increase between 6 and 8 years, this addition of child reports may not have inflated rates too much after all. Furthermore, although time-invariant confounders were accounted for, time-variant confounders (e.g., negative life events) might be at play, possibly explaining the revealed continuities. The PAPA and CAPA apply a 3-month primary period (although durations are recorded without limits), and we studied the participants every 2nd year. Anxieties emerging and then vanishing between study periods will therefore not be recorded, resulting in deflated prevalence and stability estimates. Notably, we tested multiple research questions but did not correct for multiple comparisons. Finally, the findings might not generalize to other countries.

Conclusions

One in ten children had an anxiety disorder at least once between 4 and 14 years. Specific phobia and GAD were the most prevalent disorders, both increasing by age. Except for GAD, social phobia, and specific phobia being more prevalent in girls than boys at age 14, few gender differences were found. The present study is the first to describe the development of anxiety symptoms and disorders from preschool to adolescence. Within-person analyses revealed that anxiety symptoms in early childhood years do not predict later anxiety, except for specific phobias increasing the risk of later GAD. In contrast, symptoms of GAD, separation anxiety, and specific phobia in middle childhood are less likely to vanish, and GAD symptoms increase the risk of both separation anxiety and specific phobias. The middle childhood years might therefore be a particularly important age for preventive and treatment efforts.

Supporting information

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

Figure S1. Recruitment and follow-up.
Table S1. Sample characteristics at baseline (age 4).
Table S2. Prevalence of anxiety disorders, gender specific rates, and gender differences.
Table S3. Age differences in prevalence of anxiety disorders.
Table S4. Mean number of anxiety symptoms and growth in symptoms from age 4 to 14 (n = 1,041).
Table S5. Two-year stability of anxiety symptoms and change in stability over time (N = 1,041).

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Key points

- Anxiety disorders are common in childhood, but the rate of various disorders in early childhood and whether they continue into later ages is not known
- DSM-5-defined anxiety disorders were assessed with psychiatric interviews at 4, 6, 8, 10, 12 and 14 years of age in a community sample
- One in ten had an anxiety disorder at least once between age 4 and 14. Specific phobia was the most prevalent disorder in early childhood, and GAD was the most common disorder at age 14
- Continuity of symptoms typically emerged from middle childhood, and anxiety symptoms in early childhood did not predict later anxiety when time-invariant factors were accounted for
- Preventive and treatment efforts should focus on the middle childhood years

References

Ahlen, J., & Ghaderi, A. (2020). Dimension-specific symptom patterns in trajectories of broad anxiety: A longitudinal prospective study in school-aged children. *Development and Psychopathology*, *32*, 31–41.

Angold, A., & Costello, E.J. (2000). The Child and Adolescent Psychiatric Assessment (CAPA). *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 39–48.

Balázs, J., Miklósi, M., Keresztény, Á., Hoven, C.W., Carli, V., Wasserman, C., … & Wasserman, D. (2013). Adolescent subthreshold-depression and anxiety: Psychopathology, functional impairment and increased suicide risk. *Journal of Child Psychology and Psychiatry*, *54*, 670–677.

Beesdo, K., Knappe, S., & Pine, D.S. (2009). Anxiety and anxiety disorders in children and adolescents: Developmental issues and implications for DSM-V. *Psychiatric Clinics of North America*, *32*, 483.

Cohen, J.R., Andrews, A.R., Davis, M.M., & Rudolph, K.D. (2018). Anxiety and depression during childhood and adolescence: Testing theoretical models of continuity and discontinuity. *Journal of Abnormal Child Psychology*, *46*, 1295–1308.

Copeland, W.E., Angold, A., Shanahan, L., & Costello, E.J. (2014). Longitudinal patterns of anxiety from childhood to adulthood: the Great Smoky Mountains Study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *53*, 21–33.

Costello, E.J., Egger, H., Copeland, W., Erkanli, A., & Angold, A. (2011). The developmental epidemiology of anxiety disorders: phenomenology, prevalence, and comorbidity. In W.K. Silverman & A. Field (Eds.), *Anxiety disorders in children and adolescents* (pp. 56–75). Cambridge: Cambridge University Press.

de Lijster, J.M., Dierckx, B., Utens, E., Verhulst, F.C., Zieldorff, C., Dieleman, G.C., & Legerstee, J.S. (2017). The age of onset of anxiety disorders: A meta-analysis. *Canadian Journal of Psychiatry*, *62*, 237–246.

Egger, H.L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: Presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry*, *47*, 313–337.

Egger, H.L., Erkanli, A., Keeler, G., Potts, E., Walter, B.K., & Angold, A. (2006). Test-retest reliability of the Preschool Age Psychiatric Assessment (PAPA). *Journal of the American Academy of Child and Adolescent Psychiatry*, *45*, 538–549.

Fergusson, D.M., Horwood, L.J., Ridder, E.M., & Beautrais, A.L. (2005). Subthreshold depression in adolescence and mental health outcomes in adulthood. *Archives of General Psychiatry*, *62*, 66–72.

Finsaas, M.C., Bufferd, S.J., Dougherty, L.R., Carlson, G.A., & Klein, D.N. (2018). Preschool psychiatric disorders: homotypic and heterotypic continuity through middle childhood and early adolescence. *Psychological Medicine*, *48*, 2159–2168.

Goodman, R., Ford, T., Simmons, H., Gatward, R., & Meltzer, H. (2000). Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *British Journal of Psychiatry*, *177*, 534–539.

Grills, A.E., & Ollendick, T.H. (2003). Multiple informant agreement and the anxiety disorders interview schedule for parents and children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*, 30–40.

Hamaker, E.L., Kuiper, R.M., & Grasman, R. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, *20*, 102–116.

Heiervang, E., Stormark, K.M., Lundervold, A.J., Heimann, M., Goodman, R., Posserud, M.-B., … & Gillberg, C. (2007). Psychiatric disorders in Norwegian 8-to 10-year-olds: An epidemiological survey of prevalence, risk factors, and service use. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*, 438–447.

Merikangas, K.R., He, J.P., Burstein, M., Swanson, S.A., Avenevoli, S., Cui, L.H., … & Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: Results from the national comorbidity survey replication-adolescent supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*, 980–989.

Morken, I.S., Viddal, K.R., Ranum, B., & Wichstrom, L. (2020). Depression from preschool to adolescence – Five faces of stability. *Journal of Child Psychology and Psychiatry*. https://doi.org/10.1111/jcpp.13362. Epub ahead of print.

Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and Individual Differences*, *32*, 337–348.

Muthén, L.K., & Muthén, B.O. (1998–2017). *Mplus user's guide* (8th edn). Los Angeles: Muthén & Muthén.

Nelemans, S.A., Hale, W.W., Branje, S.J.T., Meeus, W.H.J., & Rudolph, K.D. (2018). Individual differences in anxiety trajectories from Grades 2 to 8: Impact of the middle school transition. *Development and Psychopathology*, *30*, 1487–1501.

Satorra, A., & Bentler, P. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, *66*, 507–514.

Spence, S.H., Zubrick, S.R., & Lawrence, D. (2018). A profile of social, separation and generalized anxiety disorders in an Australian nationally representative sample of children and adolescents: Prevalence, comorbidity and correlates. *Australian and New Zealand Journal of Psychiatry*, *52*, 446–460.

Statistics Norway. (2012). Population's level of education. Available from: http://www.ssb.no/en/utdanning/statistikker/utniv/aar. Accessed September 22, 2019.

Steinsbekk, S., & Wichstrøm, L. (2018). Cohort Profile: The Trondheim Early Secure Study (TESS)-a study of mental health, psychosocial development and health behaviour from preschool to adolescence. *International Journal of Epidemiology*, *47*, 1401–1401i.

Sveen, T.H., Berg-Nielsen, T.S., Lydersen, S., & Wichstrom, L. (2013). Detecting psychiatric disorders in preschoolers: Screening with the strengths and difficulties questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*, 728–736.

Weems, C.F. (2008). Developmental trajectories of childhood anxiety: Identifying continuity and change in anxious emotion. *Developmental Review*, *28*, 488–502.

Wichstrøm, L., Belsky, J., & Berg-Nielsen, T.S. (2013). Preschool predictors of childhood anxiety disorders: A prospective community study. *Journal of Child Psychology and Psychiatry*, *54*, 1327–1336.

Wichstrøm, L., Berg-Nielsen, T.S., Angold, A., Egger, H.L., Solheim, E., & Sveen, T.H. (2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry*, *53*, 695–705.

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