

# Long-term effectiveness of cognitive behavior therapy for youth with anxiety disorders: Outcome, predictors and social anxiety

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Arne Kodal

Avhandling for graden philosophiae doctor (ph.d.)  
Universitetet i Bergen  
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## **Scientific environment**

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Principal investigators of the ATACA study are Professor Odd E. Havik and Professor Einar R. Heiervang.



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Arne Kodal, Bergen, 31.01.18.

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## List of abbreviations

ADHD	Attention-deficit/hyperactive disorder
ADIS-C/P	Anxiety Disorders Interview Schedule child and parent version
ADIS-IV	Anxiety Disorders Interview Schedule for DSM-IV
AIC	Akaike Information Criterion
ANOVA	Analysis of variance
BIC	Bayesian Information Criterion
CAS-CBT	Competence and Adherence Scale for Cognitive Behavioral Therapy
CBT	Cognitive behavioral therapy
CBT-PT	Cognitive behavioral therapy and parent training
CI	Confidence interval
CSR	Clinical severity rating
DASS	Depression, Anxiety and Stress Scales
DAWBA	Development and Well-Being Assessment
DSM	<i>Diagnostic and Statistical Manual of Mental Disorders</i>
EFA	Exploratory factor analysis
FIML	Full information maximum likelihood
FSC	Family social class
GAD	Generalized anxiety disorder
GCBT	Group cognitive behavioral therapy
ICBT	Individual cognitive behavioral therapy
ICC	Intraclass correlation
ICD	International Statistical Classification of Diseases and Related Health Problems
LTFU	Long-term follow-up
M	Mean
MCAR	Missing completely at random
Md	Median
MLR	Maximum Likelihood estimator with Robust standard errors
NML-C	Nijmegen Motivation List, child version
OR	Odds ratio

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p-LGM	Piecewise latent growth curve modeling
RCT	Randomized controlled trial
SABIC	Sample Size Adjusted Bayesian Information Criterion
SAD	Separation anxiety disorder
SCAS-C/P	Spence Child Anxiety Scale child and parent version
SD	Standard deviation
SDQ	Strengths and Difficulties Questionnaire
SEM	Structural equation modelling
SES	Socioeconomic class
SMFQ-C/P	Short Moods and Feelings Questionnaire child and parent version
SOP	Social anxiety disorder [Abbreviated “SAD” in Paper III]
SP	Specific Phobia

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## Abstract

Cognitive behavioral therapy (CBT) has demonstrated favorable long-term outcomes in youth with anxiety disorders in efficacy trials. However, long-term outcomes of CBT delivered in a community setting are uncertain. The aim of study presented in this thesis was to examine the long-term effectiveness of CBT for youth with mixed anxiety disorders treated in community mental health clinics. In addition, potential predictors of long-term outcomes were assessed, and subtypes of social anxiety disorder were investigated.

The thesis consists of three papers presenting findings of this study. Data stem from a randomized controlled trial examining the effectiveness of CBT for youth with anxiety disorders treated in seven participating community mental health clinics in Western Norway. A total of 139 youth (mean age at assessment 15.5 years, range 11–21 years) with a principal diagnosis of separation anxiety disorder (SAD), social anxiety disorder (SOP), and/or generalized anxiety disorder (GAD) were evaluated, on average, 3.9 years post-treatment (range 2.2–5.9 years). Long-term outcome was defined as loss of all inclusion anxiety disorders, loss of the principal inclusion anxiety diagnosis, and changes in youth- and parent-rated youth anxiety and depressive symptoms. Paper I examined the long-term outcomes of individual (ICBT) and group CBT (GCBT) using multilevel modeling and equivalence testing. Paper II assessed predictors of long-term outcomes using multilevel modeling. Paper III investigated pre-treatment subtypes of SOP in youth with the disorder drawn from the original sample, using exploratory factor analyses.

In Paper I, results demonstrated loss of all inclusion anxiety disorders in 53% of participants, loss of the principal anxiety diagnosis in 63%, as well as significant reductions in all youth- and parent-rated youth anxiety and depression symptom measures at long-term follow-up. No significant differences in outcome were identified between ICBT and GCBT, and equivalency was partially established. Significant symptom reductions were found between pre-treatment and long-term follow-up, although participants with a principal diagnosis of SOP had lower odds for recovery, compared to those with a principal diagnosis of SAD or GAD.

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In Paper II, the study identified low family social class as the most stable predictor of poorer outcomes. High treatment motivation was associated with better outcomes, whereas a diagnosis of SOP was associated with worse outcomes, including when analyses were controlled for other predictors. Recovery from the principal anxiety disorder at post-treatment was associated with better outcomes at long-term follow-up.

In Paper III, the study identified three distinct subtypes of SOP, labelled performance, observation, and interaction. Exploratory factor analyses of avoidance responses showed these were best represented by one avoidance factor. Few youth qualified exclusively for any of the fear subtypes, thus calling into question the clinical utility of these subtypes. Nevertheless, the findings indicate distinct contributions of fear and avoidance in SOP presentation.

In conclusion, the findings support the long-term effectiveness of ICBT and GCBT for youth with mixed anxiety disorders treated in community clinics. Few pre-treatment predictors were associated with long-term outcomes, although low family social class and a diagnosis of SOP were associated with poorer outcomes. High treatment motivation was associated with better outcomes. Subtypes of SOP were identifiable and differed from avoidance-based subtypes. The clinical implications of the findings are that CBT treatment for youth anxiety can be disseminated to community clinics and delivered in both individual and group formats, providing improvement rates almost on par with those in efficacy studies. Careful assessment at pre-treatment may help to identify youth who need augmented or more specific treatment, i.e., youth with SOP. It is questionable if subtypes of SOP are of clinical utility, although targeting of specific fear domains may enhance treatment.

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## List of publications

### Paper I

Kodal, A., Fjermestad, K., Bjelland, I., Gjestad, R., Öst L. G., Bjaastad, J. F., Haugland, B. S. M., Havik, O. E., Heiervang, E. R., &, Wergeland, G. J., (2018). Long-term effectiveness of cognitive behavioral therapy for youth with anxiety disorders. *Journal of Anxiety Disorders*, 53, 58-67.

### Paper II

Kodal, A., Fjermestad, K., Bjelland, I., Gjestad, R., Öst L. G., Bjaastad, J. F., Haugland, B. S. M., Havik, O. E., Heiervang, E. R., &, Wergeland, G. J., (submitted). Predictors of long-term effectiveness of cognitive behavioral therapy for youth with anxiety disorders. *Journal of Anxiety Disorders*.

### Paper III

Kodal, A., Bjelland, I., Gjestad, R., Wergeland, G. J., Havik, O. E., Heiervang, E. R., & Fjermestad, K. (2017). Subtyping social anxiety in youth. *Journal of Anxiety Disorders*, 49, 40-47.

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# 1. Introduction

This thesis presents a study of long-term follow-up (LTFU) of youth with anxiety disorders treated with cognitive behavior therapy (CBT), with the following aims: (1) to investigate the long-term effectiveness of CBT in youth with mixed anxiety disorders treated in community clinics; and (2) to assess predictors of long-term outcomes in youth treated in community clinics and the subtypes of social anxiety disorder in particular. This thesis describes research presented in three papers, of which the context, study rationale, and key findings are summarized below.

Paper I studied the effectiveness of CBT in youth with mixed anxiety disorders treated in community clinics. This paper also evaluated the effects of individual and group CBT and assessed for disorder-specific differences in treatment outcomes. Paper II examined potential predictors of long-term outcomes in youth with anxiety disorders treated in community clinics. Paper III aimed to identify content-based social anxiety disorder subtypes based on situations feared and avoided by youth.

Throughout this thesis, the term “youth” refers to children and adolescents aged 8–18 years. The term “mixed anxiety disorders” refers to anxiety disorders included in the study, namely separation anxiety disorder (SAD), social anxiety disorder (SOP), and/or generalized anxiety disorder (GAD)

## 1.1 Anxiety disorders in youth

Anxiety disorders have long been acknowledged and discussed under different terms and from different perspectives. However, the empirical study and evidence-based treatment of anxiety disorders in youth is a far more recent development spanning primarily the last 50 years (Silverman & Field, 2011). The accumulated knowledge demonstrates that anxiety disorders are highly prevalent among young people and pose a major burden on youth and their families, as well as society at large. In particular, youth anxiety impacts on daily functioning, including difficulties associated with social and peer relationships, academic interferences, lower quality of life, and disturbed family processes (Ezpeleta et al., 2001; Kendall & Ollendick, 2004; Verduin & Kendall, 2008). If left untreated, anxiety disorders in youth often

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persist into adulthood and represent a significant risk factor for a range of other mental health problems, including depression, substance abuse, and other anxiety disorders (Bittner et al., 2007; Copeland et al., 2013; Puleo et al., 2011). The deleterious impact of the immediate and long-term consequences of anxiety disorders emphasizes a clear need for early detection of, and effective and readily available treatment for these disorders in youth.

### **1.1.1 Classification**

While anxiety is a normal part of human life, sometimes it becomes excessive in intensity, frequency, and duration and causes the sufferer distress. Thus, pathological anxiety is viewed as an anxiety level that exceeds what is normally expected for the youth's developmental level, i.e., it is disproportionate to the presenting threat, persistent, irrational, and enduring and leads to impairment in one or more areas of the youth's functioning or psychosocial development (Silverman & Field, 2011). Youth anxieties cover a wide range of areas, all arising from the anticipation of a real or imagined danger and the uncertainty of the consequences this danger poses to self.

What constitutes an anxiety disorder is, in most (Western) countries, dictated either by the Diagnostic and Statistical Manual (DSM) of the American Psychiatric Association or by the International Statistical Classification of Diseases and Related Health Problems (ICD) of the World Health Organization (World Health Organization, 1992). Since their first publication, both classification systems (DSM and ICD) have been under continuous revision, including the sections on anxiety disorders, with the DSM and ICD currently on their fifth and tenth editions, respectively. To reliably assess and differentiate the different disorders, evidence-based assessment methods such as diagnostic interviews have been recommended (Silverman & Ollendick, 2005). Correct identification of mental health problems helps to pave the way for appropriate treatments. In the present study, diagnoses were made using DSM, fourth edition (DSM-IV) (American Psychiatric Association, 1994), with inclusion criteria being the presence of a diagnosis of SAD, SOP, and/or GAD as the youth's principal and most severe and impairing disorder.

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SAD is characterized by persistent, excessive, and developmentally inappropriate worry and distress relating to separation from the home and/or major attachment figures. Additional characteristics include an excessive persistent worry about losing, a reluctance or refusal to go to school, an excessive reluctance to be alone, sleep disturbances, nightmares about separation, recurrent physical symptoms (e.g., headaches, nausea, or vomiting), and fear of dramatic events that lead to separation. To fulfill the diagnostic criteria, children and youth must display three of the eight symptoms over a period of at least 4 weeks and the disturbance should cause significant impairment and distress across several areas of functioning, according to DSM-IV (American Psychiatric Association, 2000).

SOP is characterized by a persistent and excessive fear of one or more social or performance situations in which the individual is exposed to unfamiliar people or possible scrutiny by others. The individual fears that he or she will behave in a manner, or disclose anxiety symptoms, that will be humiliating or embarrassing. Other characteristics include avoidance of feared situations (or enduring feared situations with considerable discomfort and distress) and significant interference with the individual's daily life across several areas of functioning over a duration of at least 6 months, according to DSM-IV (American Psychiatric Association, 2000). DSM-IV specifies a *generalized* subtype of social anxiety in which most social situations are feared, as opposed to a *non-generalized* subtype in which the individual's fears are circumscribed and limited to specific situations (e.g., a performance situation). This taxonomy was abandoned with the introduction of DSM, fifth edition (DSM-5) (American Psychiatric Association, 2013), which introduced a content-based *performance-only* specifier (herein denoted as a performance-only subtype), describing fear restricted to public speaking and performance situations (Bögels et al., 2010). Of particular note, in Paper III, SOP has been abbreviated to "SAD."

GAD is characterized by excessive worry on most days over a period of 6 months about a number of activities and events in the individual's life (e.g., work or school performance, health, catastrophic events), causing significant distress and impairment across several areas of the individual's life. The worry should be difficult

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to control and associated with at least three out of the following six symptoms: restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbance, according to DSM-IV (American Psychiatric Association, 2000).

### **1.1.2 Prevalence**

Anxiety disorders are among the most prevalent psychiatric disorders in youth. Recent epidemiological studies indicated prevalence rates of anxiety disorders in adolescents ranging between 10% and 31.9% (Merikangas et al., 2010), while other studies reported prevalence rates ranging from 7% and 28.2% in children aged 6 to 12 years (Costello et al., 2005; Silverman & Field, 2011). At any given time, approximately 6.4% of youth fulfill the criteria for any anxiety disorder in community samples (Polanczyk et al., 2015). More specifically to the Norwegian setting, a population study of children aged 8 to 10 years in Norway indicated that 3.2% met DSM-IV criteria for an emotional disorder (primarily an anxiety disorder) and were in need of mental health treatment (Heiervang et al., 2007). Furthermore, the main anxiety disorders SAD, SOP, and GAD are associated with high comorbidity rates (Verduin & Kendall, 2003), including comorbidity with other psychiatric disorders (Angold, Costello, & Erkanli, 1999).

## **1.2 CBT treatment for anxiety disorders in youth**

CBT is a well-established treatment method for anxiety disorders in children and adolescents (Higa-McMillan et al., 2016). Since the first randomized controlled trial (RCT) was conducted by Kendall in 1994 on CBT for youth anxiety disorders (Kendall, 1994), numerous RCTs have been published, examining a range of issues and questions relating to this treatment approach (Silverman & Field, 2011), in an attempt to improve the utility and efficacy of the treatment. Meta-analyses have shown that approximately 60% of youth recover from their anxiety disorders and experience significant symptom reduction following CBT treatment (James et al., 2013; Warwick et al., 2017).

Many studies have investigated a combination of the main anxiety disorders SAD, SOP, and GAD, and also, to a lesser extent, specific phobia (SP), panic

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disorder (PD), or any one of these disorders alone (Gibby et al., 2017; James et al., 2015). Youth with one or more of the three main anxiety disorders have commonly been treated with generic treatment programs such as “Coping Cat” (Kendall, 1994) or “Friends for Life” (Barrett et al., 1996). Some treatment programs also address specific disorders such as Social Effectiveness Therapy for Children (SET-C) for childhood social phobia (Beidel et al., 2000) or adapted parent–child interaction therapy (PCIT) for separation anxiety disorder in young children (Pincus et al., 2005). Treatment programs have been adapted to apply to youth with coexistent autism spectrum disorders (Wood et al., 2009), depression, trauma, and/or conduct disorders (Chorpita & Weisz, 2009), and also exist in different delivery formats (i.e., individual and group), with varying youth and parental involvement (Kendall et al., 2008; Manassis et al., 2014).

Despite the positive results and utility of CBT in the treatment of anxiety disorders, questions remain concerning the effectiveness of CBT treatment in different treatment contexts and whether treatment outcomes are maintained in the long term. Also, little is known about: (1) predictors of long-term treatment outcomes, (2) whether youth with a principal diagnosis of SAD, SOP, or GAD respond differently to a generic treatment program in the long term, and (3) if subtypes of SOP may discriminate between underlying characteristics of youth with this disorder.

### **1.2.1 Research settings in outcome research**

Evidence for the *efficacy* of CBT rests mainly on RCTs conducted in specialized university clinics, allowing for high levels of methodological rigor and control, thus increasing the *internal* validity of the studies. *Effectiveness* studies, on the other hand, attempt to maximize the *external* validity of the studies, while maintaining an adequate level of internal validity (Hunsley, 2007). The transportability of research findings to everyday community clinics where psychotherapy is typically provided is uncertain (Hunsley & Lee, 2007; Santucci et al., 2015). This concern regarding the generalizability of research findings from efficacy studies to clinical practice is based on the assumption that important

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differences in patients, therapists, and treatment contexts all influence therapy outcome.

With regard to differences in research settings, participants in efficacy trials are usually subject to more rigorous inclusion and exclusion criteria, leading to more homogenous group compositions, compared with patient groups in community clinics (Hunsley, 2007; Weisz et al., 2013a). Recent studies showed that youth treated in community clinics are notably different from those seen in research clinics, particularly in terms of disease severity, comorbidities, and cultural and socioeconomic differences (Southam-Gerow et al., 2012; Villabø et al., 2013). Moreover, research clinic therapists commonly have undergone more extensive CBT training and hence are more likely to have greater expertise in the delivery of specific treatments, including delivering higher doses of CBT interventions, compared with community clinic therapists who are not CBT-trained (Smith et al., 2017; Southam-Gerow et al., 2012). Furthermore, research clinic therapists typically have smaller, more focused caseloads, compared with community clinic therapists whose caseloads typically encompass a broader array of disorders and referral problems (Weisz et al., 2013b). Regarding treatment context, the role of staff and facilities in research clinics are primarily dedicated to research, with less resources focused on thorough assessments, treatment monitoring, and rescheduling of missed appointments or follow-ups, compared with community clinics where the primary mandate is to provide health-care services to the community (Southam-Gerow et al., 2012; Weisz et al., 2013b). Consequently, calls have been made for more effectiveness trials to test the generalizability of CBT treatment for youth anxiety disorders when delivered in community clinics (Silverman et al., 2008).

A common strategy in effectiveness research is to transfer an empirically supported treatment to a community clinical setting, while still including research features such as thorough diagnostic assessments, randomization to treatment formats, therapist training and therapist supervision, and monitoring of treatment integrity (Southam-Gerow et al., 2012; Westbrook & Kirk, 2005). The challenge is to balance the methodological research choices on the continuum of internal and

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external validity, so that the generalizability of study results is a true reflection of the population which the study is meant to represent (La Greca et al., 2009).

### **1.3 Long-term outcomes following treatment**

Although CBT has well-documented benefits in the treatment of anxiety disorders, its long-term effects remain far less researched. Understanding the long-term outcomes of CBT is important for several reasons. Firstly, relapse of anxiety disorders can lead to detrimental consequences at individual, family, and societal levels, as early anxiety disorders predict later emotional, social, academic, and vocational problems (Copeland et al., 2014; Kendall & Ollendick, 2004). Secondly, successful CBT treatment provides protection from later sequelae, including substance use problems and suicidal ideation (Puleo et al., 2011; Wolk et al., 2015). Finally, investigating long-term outcomes is essential in establishing treatment efficacy in youth anxiety disorders (Chambless & Hollon, 1998).

#### **1.3.1 Long-term findings**

LTFU is commonly defined as 2 years or more after treatment (Gibby et al., 2017; Nevo & Manassis, 2009). To date, a total of 11 studies, based on five independent samples, have evaluated the long-term outcomes of CBT in the treatment of the main anxiety disorders (SAD, SOP and/or GAD; Barrett et al., 2001; Benjamin et al., 2013; Caporino et al., 2016; Flannery-Schroeder et al., 2004; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall et al., 2004; Kerns et al., 2013b; Puleo et al., 2011; Wolk et al., 2015; Wolk et al., 2016). The follow-up period across the 11 studies ranged from 2 to 19 years, with a mean follow-up period of 7.9 years, post-treatment. Outcomes varied across these studies, ranging from 64.9–92.7% for loss of the primary anxiety disorder (Ginsburg et al., 2014; Kendall et al., 2004) to 48–85.9% for loss of all study-entry anxiety disorders (Barrett et al., 2001; Garcia-Lopez et al., 2006). Overall, these previous long-term studies confirmed either maintenance or improvement of treatment gains following treatment completion (see table 1).

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Table 1 Long-term follow-up (LTFU) studies, sample characteristics, and diagnostic outcomes

Long-term study	Original RCT Treatment conditions	Number of treatment sessions	Mean age in years at LTFU (range)	Mean age in years since original RCT (range)	Original/LTFU (N) (% LTFU participation)	Diagnostic measure	Definition	Diagnostic outcome (%)
Barrett et al. (2001)	Barrett et al. (1996) CBT, CBT + family anxiety management, waitlist	12 sessions	16.1 (13–21)	6.17 (5.3–7.1)	79/52 (61.9)	ADIS-C	Loss of all inclusion anxiety disorders	85.70
Benjamin et al. (2013)	Kendall et al. (1997)/Kendall et al. (2008) CBT, waitlist (1997), CBT, family CBT, active control	16 sessions	27.2 (18–32)	16.24 (6.7–19.2)	150/66 (44.0)	CIDI-C	Loss of all anxiety disorders	56.06
Ginsburg et al. (2014)	Walkup et al. (2008) CBT, sertraline, CBT + sertraline, placebo	14 sessions	16.8 (11–26)	6.2 (3.7–9.9)	488/288 (59.0)	ADIS-C/P, ADIS-IV	Loss of all inclusion anxiety disorders	46.52
Kendall et al. (2004)	Kendall et al. (1997) CBT, waitlist	16 sessions	19.3 (15–22)	7.4 (5.5–9.3)	118/86 (72.9)	ADIS-C/P, ADIS-IV-L	Loss of principal anxiety disorder	90.30
Kendall & Southam-Gerow (1996)	Kendall (1994) CBT, waitlist	16 sessions	15.6 (11–18)	3.4 (2–5)	36/47 (76.6)	ADIS-C/P	Not provided	Not provided

Note: ADIS, Anxiety Disorders Interview Schedule, child/parent version; ADIS-IV, Anxiety Disorders Interview Schedule for DSM-IV, adult (L, lifetime); CBT, cognitive behavioral therapy, CIDI, Composite International Diagnostic Interview, RCT, randomized controlled trial.

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However, important limitations constrain the cited studies. Firstly, the studies vary considerably in their outcome definitions, e.g., absence of the principal inclusion anxiety disorder at follow-up as the main outcome (Kendall et al., 2004) or loss of all inclusion anxiety disorders at follow-up (Barrett et al., 2001). This difference in outcome reporting is particularly noteworthy, given the high rate of comorbidity associated with anxiety disorders (Verduin & Kendall, 2003). Thus, loss of the principal inclusion anxiety disorder does not necessarily indicate a lack of anxiety-related impairment. Furthermore, the heterogeneity in reported outcomes limits comparisons across LTFU studies and challenges the generalizability of the results. Thus, calls have been made to address this issue by clearly defining the diagnostic outcomes following treatment, e.g., recovery from anxiety disorders meaning complete loss of the principal anxiety disorder and all anxiety disorders (Warwick et al., 2017).

Secondly, the cited studies are all efficacy studies, with the already described limitations such studies pose. To the best of our knowledge, seven separate effectiveness studies of CBT for youth anxiety disorders have been published, of which none exceeded the 2-year definition of LTFU (Barrington et al., 2005; Bodden et al., 2008; Lau et al., 2010; Nauta et al., 2001, 2003; Southam-Gerow et al., 2010; Wergeland et al., 2014) and only one study including a follow-up period of 15 months (Nauta et al., 2001). Recovery rates across these seven effectiveness studies ranged from 11% to 65% for loss of all anxiety disorders (Barrington et al., 2005; Bodden et al., 2008; Lau et al., 2010; Nauta et al., 2001, 2003; Southam-Gerow et al., 2010), compared to recovery rates reported in a Cochrane review and a meta-analysis of mainly efficacy studies ranging from 47% to 66% for loss of all anxiety disorders (James et al., 2015; Warwick et al., 2017). Overall, the effectiveness studies cited above provide support for treatment maintenance or improvement of treatment gains at follow-up, although outcomes were lower compared to efficacy trials. Given the paucity of long-term effectiveness studies, there is a clear need for research on this subject.

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### **1.3.2 Treatment formats affecting outcome**

CBT can be delivered as both individual CBT (ICBT) and group CBT (GCBT), for youth with anxiety disorders. Both treatment formats have demonstrated comparable results in outcome studies of youth with anxiety disorders (Flannery-Schroeder et al., 2005; Manassis et al., 2002). These findings are of importance, given that the two formats have different strengths that may be more suited to youth with differing characteristics, e.g., in community clinics (Weisz et al., 2013). Thus, GCBT is likely to offer more opportunities for positive peer modeling, normalization, reinforcement of learned skills, and social support, and may also be more cost-effective than ICBT (Flannery-Schroeder et al., 2005; Liber et al., 2008). ICBT, on the other hand, may allow for more individual tailoring of the treatment, to optimally meet patients' specific needs (de Groot et al., 2007). To my knowledge, only one study has compared the long-term outcomes of ICBT and GCBT in patients with mixed anxiety disorders (Saavedra et al., 2010). The authors found no difference in long-term outcomes between ICBT and GCBT at a mean of 9.8 years post-treatment, consistent with previous meta-analyses based on short-term outcomes (In-Albon & Schneider, 2006; Silverman et al., 2008). Notably, however, Saavedra et al.'s study (2010) was an efficacy study, and hence these results are not necessarily generalizable to community clinics. To date, no effectiveness study has examined the long-term outcomes of ICBT and GCBT. Given the documented differences between samples in efficacy versus effectiveness samples, e.g. greater disorder severity, more comorbidity and lower socioeconomic status, these differences may affect the long-term outcome results following ICBT or GCBT differently.

### **1.3.3 Generic treatment programs**

Most studies of youth anxiety disorders have included youth with the main anxiety disorders SAD, SOP, and GAD (Gibby et al., 2017; Warwick et al., 2017). It has been argued that SAD, SOP, and GAD are manifestations of the same underlying anxiety construct and therefore are amenable to treatment with the same CBT protocols (Crawley et al., 2008; Silverman & Kurtines, 1996). However, recent short-

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term studies have shown that children with SOP have poorer treatment outcomes from generic CBT protocols, compared to those with GAD and/or SAD (Hudson et al., 2015b; Reynolds et al., 2012). In a long-term efficacy study, Kerns et al. (2013b) reported comparable outcomes for SOP, SAD, and GAD immediately following CBT but found youth with SOP were significantly less improved at 7.4-year follow-up. On the other hand, Barrett et al. (2001) found no evidence that pre-treatment diagnosis, including SOP, differentially affected long-term treatment outcomes. Thus, further studies on the long-term effects of CBT in youth with different principal anxiety diagnoses are warranted.

In summary, evidence suggests that outcome following CBT for youth anxiety disorders is maintained at long-term. However, difference in outcome reporting, a limited number of separate long-term studies and the lack of research from community mental health clinics constrains the conclusions that might be drawn from this research. It is uncertain if effects following different treatment formats (ICBT vs. GCBT) are similar, when treatment is delivered in a community clinic, and if youth with different principal anxiety diagnoses respond differently to treatment. Thus, there is a clear need to investigate the long-term outcome of CBT for youth anxiety disorders, when delivered in community mental health clinics.

## **1.4 Predictors of long-term outcomes**

### **1.4.1 Short-term findings**

A variety of factors may affect treatment outcomes following CBT for youth anxiety disorders. Examining predictors of treatment outcomes is important to help to understand the characteristics of recovered and non-recovered youth and find possible ways on how to adapt treatment approaches so as to enhance and improve treatment gains. Recent reviews of predictors of short-term treatment outcomes, symptom severity, comorbidity, and parental psychopathology, have demonstrated these factors to be inconsistently associated with treatment outcomes (Knight, et al., 2014;

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Lundkvist-Houndoumadi & Thastum, 2015). In line with these findings, the Child/Adolescent Anxiety Multimodal Study (CAMS) trial identified lower anxiety severity, based on composite parent- and clinician-rated anxiety measures, and lower caregiver strain to be associated with better treatment outcomes (Compton et al., 2014). Also, a large multi-site study including more than 1500 children with a primary anxiety disorder found that parent psychopathology and a comorbid mood or an externalizing disorder were significantly associated with poorer outcomes (Hudson et al., 2015a).

While these findings are important regarding acute treatment outcomes, these identified predictors are not necessarily associated with long-term outcomes. Kerns et al. (2013b) reported that a principal diagnosis of SOP demonstrated a differential effect on short-term post-treatment outcomes compared with long-term outcomes at 7.4 years after treatment. Furthermore, in an analysis modeling non-linear anxiety symptom trajectory from pre- to post-treatment, Chu et al. (2013) described a differential impact of baseline predictors (age, anxiety severity, and treatment engagement) over time.

### **1.4.2 Long-term findings**

Current knowledge of long-term outcome predictors for CBT in youth come from the aforementioned five independent samples that evaluated the long-term outcomes of CBT in the treatment of the main anxiety disorders (Barrett et al., 2001; Benjamin et al., 2013; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall et al., 2004). These studies examined selected pre-treatment predictors within four overarching groups, consisting of: (1) demographic variables (i.e., age, gender, SES, and ethnicity), (2) youth variables (i.e., anxiety severity, principal diagnosis, and comorbidity), (3) parent variables (i.e., parental education, parental marital status, parental anxiety, family functioning, and stress), and (4) post-treatment response (Barrett et al., 2001; Benjamin et al., 2013; Caporino et al., 2016; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall et al., 2004; Kerns et al., 2013b; Puleo et al., 2011). No predictor was found to be significantly associated with treatment outcomes, across more than two studies. Thus, two studies identified two

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predictors of treatment outcomes: negative life events during the follow-up period and post-treatment remission from the principal diagnosis (Ginsburg et al., 2014; Kendall et al., 2004). Mixed results were obtained regarding youth anxiety severity at pre-treatment, principal diagnosis, comorbidity, externalizing disorder/symptoms, and family functioning as potential predictors (Barrett et al., 2001; Benjamin et al., 2013; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall et al., 2004). Variables not found to be related to long-term outcomes included age, ethnicity, parental education, parental marital status, and parental anxiety (see Table 2.).

However, these above studies carry several limitations. They included small sample sizes ( $N < 100$ ) (Barrett et al., 2001; Kendall & Southam-Gerow, 1996), varying outcome definitions (e.g., diagnostic endpoint versus rate of change) (Rapee et al., 2013), and a mean retention rate of 63% (range: 44–92%) of the original study samples (Barrett et al., 2001; Benjamin et al., 2013; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall et al., 2004). Also, only two of the studies examined a range of predictors spanning all four predictor groups (Ginsburg et al., 2014; Kendall et al., 2004), whereas the other studies examined fewer predictors within certain predictor groups only (Barrett et al., 2001; Benjamin et al., 2013; Kendall & Southam-Gerow, 1996). Thus, although overall a range of predictors have been assessed, it remains that the majority of predictors have been investigated in a few studies only, in relation to varying definitions of outcome. Therefore, it is crucial to further investigate youth, parental, and demographic predictors, in order to improve understanding of the impact of these predictors over time (Gibby et al., 2017).

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Table 2. Predictors of CBT outcome at long-term follow-up (LTFU)

Long-term study	Age	Gender	Ethnicity	Income/SES	Parental education	Parental anxiety	Family functioning	Principal disorder	Anxiety severity	Comorbid disorder	Negative life events during follow-up	Post-treatment loss of principal anxiety disorder
Barrett et al. (2001)	-	-	-	-	-	-	-	NS	NS	NS	-	-
Benjamin et al. (2013)	-	-	-	-	-	-	-	NS	NS	NS	-	No recovery
Ginsburg et al. (2014)	NS	Female	NS	Low	NS	NS	Poor	-	Higher	NS	Greater number	No recovery
Kendall et al. (2004)	NS	NS	-	NS	-	-	-	SOP	NS	Externalizing symptoms	Greater number	No recovery
Kendall & Southam-Gerow (1996)	-	-	-	-	-	-	-	-	-	-	-	-

Note: Dashes indicate that results were not reported in the study. NS, not significant; SES, socioeconomic status; SOP, social anxiety disorder.

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### **1.4.3 Predictors in a community mental health setting**

Drawing firm conclusions from the current research of long-term outcome predictors is difficult. This relates both to the inconsistent findings, the noted study limitations, but also to the context within which the studies were performed. As noted, the above cited studies are all efficacy studies that were conducted at specialist research clinics. As with treatment outcomes, it is unknown to what extent predictor findings from these trials are transferable to community clinics (Hunsley & Lee, 2007; Santucci et al., 2015). Indeed, a number of predictors previously associated with short- and long-term outcome (albeit inconsistently) also characterize community samples compared to samples from specialist research settings. Among these factors are higher levels of anxiety severity, more comorbidity, greater functional impairment, higher levels of life stressors, and lower socioeconomic status (Ehrenreich-May et al., 2011; Ginsburg et al., 2014; Southam-Gerow, Chorpita, Miller, & Gleacher, 2008; Villabø et al., 2013; Wergeland et al., 2016). Thus, examination of predictors of long-term outcome in a community mental health clinic should include variables that are representative of community populations, particularly socioeconomic status, impairment, comorbidity and anxiety severity.

### **1.4.4 Additional factors related to long-term outcome**

The inclusion of factors beyond youth, parent and demographic variables could improve our understanding of factors associated with treatment outcome. To my knowledge, treatment motivation, defined as acknowledgment of problems, perceived distress, and willingness to face these difficulties (Keijsers et al., 1999; Westra & Dozois, 2006), has not been investigated in relation to long-term outcomes of CBT in anxious youth. Given the expectation to participate in, and endure, procedures that would cause discomfort (e.g., exposure in CBT protocols), motivation would be particularly relevant to the treatment of anxious youth (Kendall et al., 2009; Smith et al., 2017). Furthermore, continued motivation to address anxiety problems may be particularly important to maintain long-term treatment gains. Thus, early acknowledgment of problems and willingness from the youth to accept help and

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address these problems are also likely to impact long-term outcomes. Motivation has been identified as a positive predictor of outcome at 1-year follow-up (Wergeland et al., 2016). Thus, youth motivation at pre-treatment should be examined as a predictor of long-term outcomes.

Held together, research on predictors of long-term treatment outcome has identified a small number of factors with inconsistent associations to long-term outcome. Methodological properties of previous studies may account for some of these inconsistencies, while the restricted number of predictors examined across the studies limits any firm conclusions. Additionally, the generalizability of previous findings to community clinics may be questioned. Thus, there is limited knowledge of predictors of long-term outcome of CBT for youth anxiety disorders delivered in community mental health clinics. Clearly, there is a need to advance and expand on the existing knowledge of long-term outcome predictors in this setting.

## **1.5 Subtypes of social anxiety disorder**

As noted, evidence suggests that short-term outcomes seem less favorable for SOP than for the other main anxiety disorders among youth, both in efficacy and effectiveness studies (Crawley, Beidas, Benjamin, Martin, & Kendall, 2008; Hudson, Rapee, et al., 2015; C. M. Kerns et al., 2013; Wergeland et al., 2016). In regards to long-term outcomes for youth with SOP, results are both sparse and mixed, i.e. demonstrating no association to outcome and a negative association to outcome (Barrett et al., 2001; Benjamin et al., 2013; Kerns et al., 2013b). Several reasons for this less favorable outcome have been suggested, including a greater degree of behavioral inhibition (Essex, Klein, Slattery, Goldsmith, & Kalin, 2010), excessive self-focus (Rapee, Gaston, & Abbott, 2009), a negative interpretation bias of social situations (Vassilopoulos & Banerjee, 2008) and/or negative interpretation of the quality of one's own performance in social situations (Blöte et al., 2014). However, no clear conclusions on this subject have gained consensus (Hudson, et al., 2015; Spence & Rapee, 2016). Accordingly, further empirical examinations of

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characteristics of SOP are called for (Crawley et al., 2008; Hudson, Rapee, et al., 2015). In this regard, subtypes of SOP represent one such avenue of investigation, which has received only limited attention in the youth anxiety literature (Bögels et al., 2010).

### **1.5.1 Characteristics of subtypes of SOP**

Symptoms of social anxiety can be observed in a wide range of social situations, and it is assumed that these situations are grouped into discrete domains that trigger underlying fear dimensions, denoted by several research groups as SOP subtypes (Cox et al., 2008; Holt et al., 1992; Hook et al., 2013). These subtypes do not represent groupings of individuals but manifestations of distinct underlying characteristics and processes that again relate to the fears that individuals with SOP experience within certain fear domains. Furthermore, in the sense that subtypes represent underlying characteristics and processes, there is an increasing recognition of the importance of maladaptive self-deficiency concerns or core fears in the development and maintenance of SOP (Moscovitch, 2009; Spence & Rapee, 2016). Such core fears relate to distinct fear situations and contexts in which the patient's perceived deficiencies are at risk of being revealed. These fears are not mutually exclusive or qualitatively distinct, but rather highly correlated and are often present simultaneously (Moscovitch, 2009). As such, identifying content-based subtypes of SOP can facilitate the identification of fear domains and the underlying processes in youth with SOP. This could represent a step towards improving diagnosis and treatment of the disorder (Bögels et al., 2010; Dalrymple & D'Avanzato, 2013).

### **1.5.2 Competing perspectives on social anxiety subtypes**

DSM-5, the most recent edition of DSM (American Psychiatric Association, 2013), has introduced a content-based performance-only specifier (herein denoted as the performance-only subtype), describing fear restricted to public speaking and performance situations (Bögels et al., 2010). It is assumed that individuals with predominantly performance fears are, in some way, categorically distinct from those with predominantly other SOP symptoms. A competing continuum perspective on

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SOP assumes that differences between affected individuals are a result of the number of feared and/or avoided social situations (Bögels et al., 2010). These competing perspectives remain disputed (Aderka et al., 2012; Hook et al., 2013; Vriends et al., 2007).

Moreover, previous studies on subtypes have primarily relied on clinically derived definitions of subtypes, as opposed to statistically derived definitions (Bögels et al., 2010; Burstein et al., 2011; Hofmann et al., 2004). This presupposes theoretical and preconceived views on the meaning of, and relationships among, fears. This highlights an important caveat not only with regard to the performance-only subtype, but also to other clinically identified subtypes—which specific situations define the subtypes? DSM-5 does not help to address this concern, as it offers only a general description of the performance-only fears (American Psychiatric Association, 2013; Dalrymple & D’Avanzato, 2013). This therefore leaves the definition of subtypes open to theoretical preference and interpretation. A statistical approach could help not only to identify which situations could define the subtypes, but also to identify such fear dimensions by presupposing these subtypes represent underlying characteristics and processes.

A limitation of previous research on diagnostic subtypes of SOP has been the inclusion of adult samples (Dalrymple & D’Avanzato, 2013). Thus, generalization of these findings to youth can be problematic, as contextual and developmentally related differences between youth and adults (e.g., living with parents, age-related changes in fear profiles, and the opportunity for avoidance) are known to influence SOP expression (Rao et al., 2007; Spence & Rapee, 2016; Westenberg et al., 2004). Therefore, it is relevant, as well as clinically important, to comparatively explore if SOP subtypes identified in adult populations also apply to youth populations, not least the performance-only subtype introduced in DSM-5.

### **1.5.3 Fear and avoidance subtypes**

Fear and avoidance of social situations are the two core features of SOP (American Psychiatric Association, 2013; Clark & Wells, 1995; Rapee & Heimberg, 1997). However, previous studies of SOP subtypes in both adults and youth either

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studied fear and avoidance together or examined fear alone (Aderka et al., 2012; Burstein et al., 2011; Kerns et al., 2013a; Vriends et al., 2007). A reason for this is that avoidance and fear are often highly correlated and thus are assumed to follow the same subtype structure (Heimberg et al., 1999; Oakman et al., 2003). Rapee and Spence (2004), however, proposed that in youth, avoidance develops independently of social fear, in the sense that the typical onset of SOP in early adolescence is reflected by an increase in avoidance, rather than an increase in social fear. Thus, they suggest that the propensity to avoid distressful situations increases more with age than does the level of fear (Rapee and Spence, 2004). This argument was supported by Sumter et al. (2009) who examined age-related differences in youth avoidance and fear across three predetermined fear domains. In the fear domain labeled as formal speaking/interactions, they demonstrated that fear and avoidance follow different paths with increasing age, with avoidance demonstrating a steeper increase than fear (Sumter et al., 2009). These related, yet independent, developmental patterns of fear and avoidance may indicate a need for independent assessments of each of these aspects of SOP.

In sum, research on subtypes of social anxiety disorder among youth is limited and competing perspectives to best describe the heterogeneity of the disorder are disputed. Furthermore, it is unclear if fear and avoidance subtypes coincide, or if they capture discrete features of the disorder. Identification of subtypes may contribute with knowledge on characteristics of SOP, which could help explain why youth with SOP demonstrate poorer outcomes following CBT, compared to youth with SAD or GAD. Ultimately, this knowledge could help improve diagnosis and treatment of the disorder.

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## 2. Aims

In Paper I, the first aim was to investigate the long-term outcomes of CBT in youth with anxiety disorders treated in community mental health clinics. Based on previous long-term efficacy, as well as short-term effectiveness, studies, it was predicted that CBT outcomes would be maintained or improved in the community setting, but with outcomes inferior to those in comparative efficacy studies. The second aim was to investigate the effects of using different treatment formats (i.e., GCBT *versus* ICBT) on long-term outcomes. Based on existing evidence, it was hypothesized that the effects of both treatment formats would be maintained during the 1-year follow-up period and be equivalent at LTFU. The third aim was to assess for disorder-specific differences in treatment outcomes, for which it was predicted that outcomes in youth with a principal diagnosis of SOP would be inferior, compared to those with a principal diagnosis of GAD and/or SAD. Primary outcomes were loss of all inclusion anxiety diagnoses (SAD, SOP, and GAD) and loss of the principal anxiety diagnosis. Secondary outcomes were change in youth- and parent-reported anxiety, change in depressive symptoms, and change in clinical severity rating (CSR) scores of the primary, secondary, and tertiary diagnoses.

In Paper II, the primary aim was to examine predictors of long-term treatment outcomes in youth with anxiety disorders treated with manualized CBT in community mental health clinics. Predictors used in this study were grouped into three categories: (1) youth-related variables (i.e., youth- and parent-rated anxiety symptoms, comorbidity, impairment due to symptoms, principal anxiety diagnosis at inclusion, and motivation for treatment), (2) parent-related variables (family social class (FSC), family stresses, and parent self-rated anxiety, stress, and depressive symptoms), and (3) post-treatment outcome (loss of the principal anxiety diagnosis at post-treatment). It was hypothesized that youth with a principal diagnosis of SOP would demonstrate poorer treatment outcomes, and higher levels of pre-treatment motivation and remission of the principal anxiety diagnosis at post-treatment would predict better outcomes at LTFU. No other *a priori* hypotheses were stated. Long-term outcomes assessed were loss of all inclusion anxiety diagnoses (SAD, SOP, and/or GAD), loss

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of the principal anxiety diagnosis, and anxiety symptom improvement (i.e., change in youth- and parent-rated anxiety symptoms).

In Paper III, the primary aim was to use data-driven exploratory classification methods to examine and identify content-based SOP subtypes empirically, using broad and established measures of social fear to assess both youth and parental scores. A further aim of the study was to examine and compare the subtype structures of feared and avoided situations. No *a priori* hypotheses were stated.

### **3. Methods**

The study presented in this thesis formed part of the Assessment and Treatment—Anxiety in Children and Adults (ATACA) trial, an effectiveness RCT that investigated evidence-based manualized CBT for anxiety disorders delivered in community clinics. The ATACA trial comprised two separate studies—one including an adult population, and the other including youth, the latter being the focus of this thesis.

The background for the current study was based on findings from the Bergen Child Study, a large epidemiological study ( $N = 9155$ ) which showed that 13.3% of children with emotional problems (primarily anxiety diagnoses) received specialist mental health-care services for their problems, whereas 74.5% of children with attention deficit/hyperactivity disorder (ADHD) and 41.4% of children with behavioural disorders received mental health-care services (Heiervang et al., 2007). The main aim of the study was to address this discrepancy in treatment rates and to improve the quality of assessment and treatment for youth with anxiety disorders.

The initial planning of the study took place in 2006, with pilot treatments beginning in 2007. Recruitment for the RCT started in January 2008. Prior to the start of the RCT, statistical power analyses were carried out to determine the appropriate number of participants needed in the study (see Section 3.5). The last participants received treatment in April 2011. The 1-year follow-up was completed by May 2012, and the LTFU took place between August 2013 and March 2014.

The study was approved by, and conducted in accordance with, the Western Norway Regional Committee for Medical and Health Research Ethics.

#### **3.1 Procedure and participants**

The original RCT study participants were recruited from youth routinely referred to the participating clinics. Whether the youth or their parents consented or declined study participation did not influence their right to receive services from the clinics. Youth and parent consent included participating in the treatment program, to have all treatment sessions and assessments video-recorded, participation in the 1-

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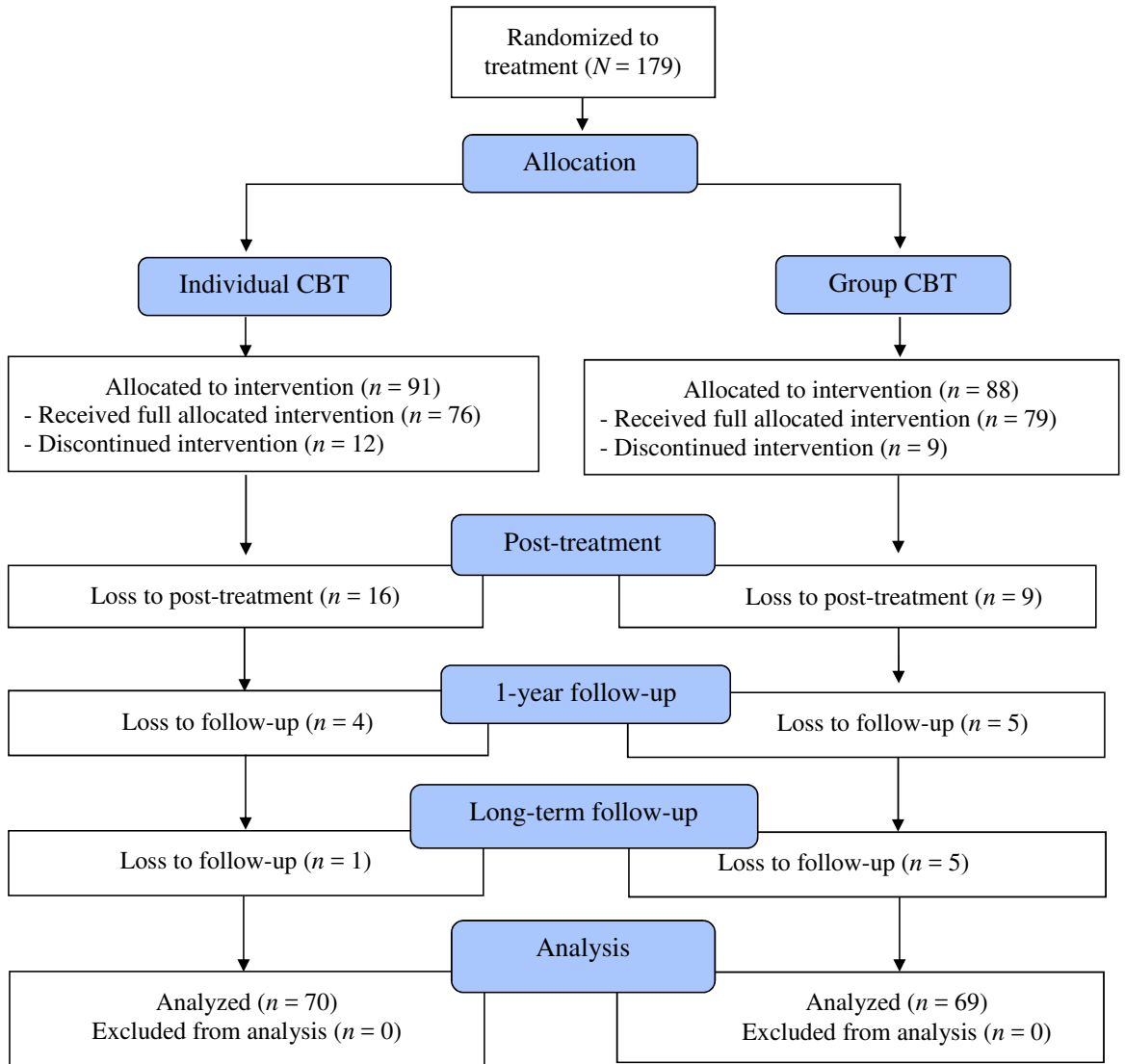
year follow-up and possible contact from the researchers regarding participation in future LTFU assessments. All assessments at pre-treatment, post-treatment, and 1-year follow-up were completed separately by the youth and parents and included a diagnostic interview and self- and parent-reported questionnaires (Wergeland et al., 2014). The inclusion criterion for the original RCT was a principal diagnosis of SAD, SOP or GAD. The exclusion criteria were the presence of a pervasive developmental disorder, psychotic disorder, severe conduct disorder, and/or mental retardation. In sum, 182 youth were included and were randomized to ICBT, GCBT, or a 10-week waitlist control, following a block randomization procedure. Of the 38 youth randomized to the waitlist control, two withdrew from the study and one was diagnosis-free after the waitlist period. These three youth were excluded from subsequent analyses. The remaining 35 youth in the waitlist control group were then randomized to either ICBT or GCBT on completion of the waitlist period. Thus, a total of 179 youth participated in the original study of which 91 were randomized to ICBT and 88 to GCBT.

Inclusion, treatment, and 1-year assessment were conducted from 2008 to 2012, and long-term follow-up (>2 years post-treatment) was completed in 2014. Prior to the LTFU, a letter was sent to all 179 included youth aged above 16 years, as well as to the parents of youth aged under 16 years, informing them of the forthcoming LTFU and inviting them to participate. Youth and parents who provided written consent were scheduled for separate youth and parent 90-minute interviews. Parents were not required to participate if the youth had reached legal age of 18 years ( $n = 33$ ), and participated only at the youth's request. Most interviews were conducted face-to-face in community outpatient clinics. Fourteen interviews were conducted by phone, as participants had relocated geographically. Participating youth and parents were each compensated with a gift card (worth USD \$60). Assessment measures at LTFU included the same interviews and questionnaires as those used in the previous assessment rounds to ensure maximal comparability across time points. The exception to this rule was the use of the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV) interview for youth aged 18 years or older ( $n = 32$ ). For details on the measures used, see Section 3.4. Of the original 179 youth, 154

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completed the intervention and post-treatment assessments. Of these, 145 completed the 1-year follow-up assessment. Among the youth completing the intervention and post-treatment assessment ( $n = 154$ ), 15 declined participation in the LTFU (see fig. 1).

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**Fig. 1** Participant flowchart.



A total of 139 youth participated in the long-term follow-up study and were assessed over an average of 3.9 years post-treatment ( $SD = 0.8$ , range 2–6 years). The long-term sample accounted for 77.7% of the total original sample and 90.3% of treatment completers. Age of participants at LTFU ranged from 11 to 21 years ( $M = 15.5$ ,  $SD = 2.5$ ), and 54.7% ( $n = 76$ ) were female. Principal disorders included SAD (35.3%), SOP (46.0%), and GAD (18.7%). The mean pre-treatment clinician severity rating (CSR; 0–8 scale) for the principal diagnosis was 7.0 and the mean number of inclusion anxiety disorders was 2.0. A total of 62 (46.0%) participants had at least one non-inclusion comorbid disorder at pre-treatment. Participants were predominantly Caucasian ( $n = 128$ , 92.1%) and three were Asian (2.2%), whereas ethnicity was not registered for the remaining 8 participants (5.8%). Parental occupational status was classified into rank-ordered FSCs, in accordance with the Registrar General Social Class coding scheme (Currie et al., 2008), with the highest-ranking parent determining the FSC. High, medium, and low FSCs accounted for 48.5% ( $n = 68$ ), 31.7% ( $n = 44$ ), and 10.8% ( $n = 15$ ) of participating families, whereas the FSC was unknown for 8.6% ( $n = 12$ ) of families.

Youths included in the present long-term follow-up study were compared to those from the original RCT who did not participate in the study ( $n = 40$ ) in terms of pre-treatment socio-demographic characteristics (i.e., age, gender, parental occupational status, single parent status), pre-treatment youth- and parent-reported clinical variables (i.e., CSR of the principal anxiety disorder, anxiety and depressive symptoms), and the presence of the principal inclusion anxiety disorder post-treatment. There were no significant differences in any of these variables (data not shown). Furthermore, no differences were found in post-treatment outcomes (loss of the principal diagnosis, loss of all anxiety diagnoses, and changes in youth and parent anxiety and depressive symptom measures) between youths who participated and those who did not participate in the long-term follow-up.

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In Paper III, youth with any SOP diagnosis at inclusion, i.e., regardless of whether the diagnosis was principal, secondary, or tertiary, were selected ( $n = 131$ ) from the original sample of 179 participants.

### **3.2 Treatment protocol**

The treatment manual used in the RCT was *FRIENDS for life*, fourth edition (Barrett, 2005). This program stems from the Australian Coping Koala program (Barrett et al., 1991) that was adapted from Kendall's original *Coping Cat Workbook* (Kendall, 1990). The main elements of the program are affective awareness and relaxation techniques, problem-solving skills training, cognitive restructuring techniques, and exposure exercises. Youth aged 8–12 received the child version of the protocol, whereas youth aged 12–15 received the adolescent version. Youth aged 12 were treated using either the child ( $n = 34$ ) or the adolescent version ( $n = 5$ ), based on the clinician's assessment of the youth's level of maturity. The ICBT protocol comprised ten 60-minute sessions, and the GCBT protocol comprised ten 90-minute sessions. Two booster sessions were conducted at 1 and 3 months after the tenth session. Parents attended two of the ten sessions and the last 15 minutes of the remaining eight sessions, as well as two separate parent-only sessions.

The program was translated into Norwegian by a Norwegian team of psychologists, in collaboration with Dr. Paula Barrett, the manual author. *FRIENDS for life* has been reported to be an effective treatment for anxiety disorders in youth, when delivered in group (Liber et al., 2008), as well as individual (Shortt et al., 2001), formats. A small case-series pilot study also described significant effects on self-reported anxiety symptoms obtained with the program in Norway (Martinsen et al., 2009).

### **3.3 Setting, therapists, and assessors**

The RCT was conducted at seven public child and adolescent mental health outpatient clinics in Western Norway, covering both rural and urban areas. Clinics are not specialized in the treatment of specific disorders or therapy orientation, and their

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staff come from a range of professional backgrounds. Youth are typically referred to the clinics by their general practitioner or occasionally by child protection services. Clinics are part of the public health care-system in Norway and provide free-of-charge services.

Seventeen therapists participated, of whom five had completed a formal 2-year postgraduate CBT training and the remaining 12 had little or no previous training in CBT. All therapists received training in the *FRIENDS for life* protocol, as well as supervision throughout the treatment sessions by licensed FRIENDS therapists. All treatment sessions were delivered as part of the therapist's routine caseload, and all therapists administered both ICBT and GCBT, with two therapists participating in each GCBT session.

Assessment at all time points, except the LTFU, was conducted by 16 assessors, all clinicians employed at the clinics. Assessors attended workshops on CBT and anxiety disorders, and received specific training in the Anxiety Disorders Interview Schedule, child and parent version (ADIS-C/P) from certified ADIS-C/P raters in a 2-day workshop. Assessors conducted the interviews and administered the questionnaires. It was not possible to blind the assessors to the treatment approach, since they worked at the same clinics where treatment took place. At LTFU, interviews and questionnaires were administered by three certified ADIS-C/P raters. Fourteen of these interviews were conducted by phone, as the participants had moved out of the region.

### **3.3.1 Therapist adherence and competence**

All therapy sessions were video-recorded, of which 20% were randomly selected for monitoring therapist treatment adherence and competence. Adherence and competence were assessed using the Competence and Adherence Scale for Cognitive Behavioral Therapy (CAS-CBT) (Bjaastad et al., 2016), a 7-point scale ranging from 0 (none/poor skills) to 6 (thorough/excellent skills). Therapists' mean scores for adherence to both treatment formats ranged from 3.97 to 5.42 ( $M = 4.60$ ,  $SD = 0.88$ ), and for competence from 3.25 to 5.22 ( $M = 4.12$ ,  $SD = 0.97$ ). A

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predetermined score of 3.0 was set as the minimum threshold for adequate therapist adherence and competence.

### 3.4 Measures

The current study used a multi-method and multi-informant approach to assess the participating youth. This approach has been recommended to obtain a comprehensive snapshot of the youth’s problem (Silverman & Ollendick, 2005). The multi-informant assessment, consisting of youth and parent reports, was included due to identified discrepancies between youth and parent assessments of youth anxiety symptoms (Comer & Kendall, 2004). The multi-method approach consists of categorical (diagnostic) and dimensional measures, and provides a broad assessment of the anxiety diagnoses, in line with recent recommendations for youth anxiety assessment in outcome studies (Warwick et al., 2017). An overview of the included measures included in Papers I–III is presented in Table 1.

**Table 3.** Overview of measures.

	$\alpha$		Time point			
	Inclusion ( $N = 179$ )	LTFU ( $N = 139$ )	Inclusion	Post- treatment	1-year FU	LTFU
<b>Diagnostic interviews</b>						
ADIS-C/P	–	–	×	×	×	×
ADIS-IV	–	–				×
DAWBA	–	–	×			
<b>Questionnaires</b>						
SCAS	0.91	0.89	×	×	×	×
SMFQ	0.88	0.93	×	×	×	×
NML	0.87	–	×			
DASS	0.95	–	×			×
SDQ-i	0.80	–	×			

*Note:*  $\alpha$ , intraclass correlation; ADIS-C/P, Anxiety Disorders Interview Schedule, child/parent; ADIS-IV, Anxiety Disorders Interview Schedule IV; DASS, Depression, Anxiety, and Stress Scales;

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DAWBA, Development and Well-Being Assessment; FU, follow-up; LTFU, long-term follow-up; NML, Nijmegen Motivation List; SCAS, Spence Children's Anxiety Scale; SDQ-i, Strengths and Difficulties Questionnaire-Impact; –, not applicable; ×, filled out.

### **3.4.1 Diagnostic interviews**

#### *3.4.1.1 Anxiety Disorders Interview Schedule, child and parent version (ADIS-C/P)*

The ADIS-C/P version (Silverman & Albano, 1996) is a semi-structured interview, of which the modules assessing the DSM-IV criteria for the diagnoses of SAD, SOP, and GAD were used to assess inclusion diagnoses in youth aged 17 years or younger ( $n = 107$ ) and used as the primary outcome measure. Youth and parents were interviewed independently. The severity of each diagnosis was assessed using the CSR scale with scores ranging from 0 to 8, with a minimum CSR score of 4 required for a clinical diagnosis to be assigned (Silverman & Albano, 1996). Diagnosis and CSR were assigned based on the youth and parent composite score, in accordance with the ADIS-C/P guidelines outlined previously (Silverman & Albano, 1996). In the case of multiple anxiety disorders, the disorder causing the highest interference was considered to be the principal diagnosis. The ADIS-C/P interview was previously shown to have high interrater reliability (Silverman & Nelles, 1988), retest reliability (Silverman et al., 2001), and good concurrent validity (Wood et al., 2002).

In Paper I, analyses of social anxiety subtypes were based on the SOP module of the ADIS-C/P interview. This module covers 23 situations in which youth may experience fear and/or show avoidance. If fear was confirmed, the youth/parent were asked to rate the degree of fear experienced in relation to the specific situation, on a scale ranging from 0 to 8. If the fear rating was 4 or above, the youth/parent were asked to indicate whether the youth avoided or endured the situation with considerable distress. Avoidance was scored as either “present = 1” or “not present = 0.” The separate youth and parent fear and avoidance ratings were combined into integrated scores. Thus, the highest fear rating and presence of avoidance endorsed by either the youth *or* the parent were carried forward into the integrated scores.

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### 3.4.1.2 Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV)

The ADIS-IV (Brown et al., 1994) was used to assess DSM-IV criteria for SAD, SOP, and GAD in youth aged 18 years or older ( $n = 32$ ). Similar to the ADIS-C/P, the CSR scale ranges from 0 to 8, with a minimum CSR score of 4 required for a clinical diagnosis to be given. The interview has previously demonstrated good to excellent reliability (Brown et al., 1994, 2001). The ADIS-IV and the ADIS-C/P interviews were slightly modified for the LTFU assessment, to also include information on youth's receipt of any additional anxiety treatment since completion of the CBT program.

Diagnostic interviews conducted face-to-face were video-recorded, whereas interviews conducted by phone (10.1%) were not. At all assessment time points throughout the study, a random selection of 20% of the video-recorded interviews from each clinic was re-coded by expert raters blind to the assessors' ratings. For the LTFU, interrater agreement for the specific anxiety diagnoses in the combined youth and parent reporting scores were kappa ( $\kappa$ ): SAD = 1.00, SOP = 0.93, and GAD = 0.85. For the CSR, the specific intraclass correlations (ICCs) for the LTFU sample, using youth and parent reporting scores, were: SAD = 1.00, SOP = 0.94, and GAD = 0.93. At inclusion, interrater agreement for the specific anxiety diagnoses based on the combined youth and parent ADIS-C/P reporting scores, were  $\kappa$ : SAD = 0.86, SOP = 0.83, and GAD = 0.86. For the CSR, the specific ICCs for the total sample at inclusion ( $N = 179$ ), based on youth and parent reporting scores, were: SAD = 0.72, SOP = 0.88, and GAD = 0.89.

### 3.4.1.3 Development and Well-Being Assessment (DAWBA)

The DAWBA (Goodman et al., 2000) is a web-based diagnostic tool, combining structured and open-ended questions about a child's psychiatric symptoms and impairment. In the present study, the DAWBA was used at intake, and both youth's and parents' completed interviews were used to assess comorbid disorders and to provide demographic data and information on family stressors. Non-anxiety comorbidity was based on disorders identified from the DAWBA interviews, other than the three inclusion disorders, which included mood disorders (i.e., depressive

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disorder, bipolar disorder), externalizing disorders (i.e., attention deficit and hyperactive disorder, oppositional defiant disorder), other anxiety disorders (i.e., a specific anxiety disorder, post-traumatic stress disorder, occupational compulsive disorder, and/or panic disorder), and tic disorders. Non-anxiety comorbidity was defined as the co-occurrence of one or more of the inclusion diagnoses and one or more non-inclusion disorder.

Family stress, included in Paper II, was covered by 13 items, rated on a 3-point scale (0 = none, 1 = some, 2 = major), yielding a maximum score of 26. The DAWBA has shown good discriminative ability between clinic and community youth populations (Goodman et al., 2000) and has also demonstrated good to excellent interrater reliability (Ford et al., 2003; Heiervang et al., 2007). In the present study, a total of 44 pre-treatment interviews were chosen for reliability analysis; agreement was satisfactory to excellent ( $\kappa = 0.66\text{--}1.00$  for non-anxiety comorbid disorders) (Wergeland et al., 2014).

FSCs were classified into rank-ordered social classes, in accordance with the Registrar General Social Class coding scheme (Currie et al., 2008), and were determined by the highest-ranking parent. Classes were categorized as high, medium, or low but, for purposes of this study, were dichotomized into low *versus* medium and high.

### **3.4.2 Questionnaires**

#### *3.4.2.1 Spence Child Anxiety Scale, child and parent version (SCAS-C/P)*

The SCAS-C/P (Spence, 1998) was used to assess youth anxiety symptoms. The SCAS comprises 38 items rated on a 4-point scale (0 = never, 1 = sometimes, 2 = often, 3 = always), with a maximum score of 114. SCAS-C/P validity, internal consistency, and adequate test–retest reliability were previously demonstrated (Spence, 1998; Spence, Barrett, & Turner, 2003).

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#### 3.4.2.2 *Short Mood and Feelings Questionnaire, child and parent version (SMFQ-C/P)*

The SMFQ-C/P (Angold, Costello, Messer, & Pickles, 1995) was used to assess youth depressive symptoms. The SMFQ consists of 13 items rated on a 3-point scale (0 = not true, 1 = sometimes true, 2 = true), with higher scores indicating greater severity of symptoms. In a general population sample, a cutoff score of  $\geq 8$  was found to represent the best balance between sensitivity and specificity, compared to a diagnosis of depression (Angold et al., 1995). The SMFQ was previously shown to have excellent internal consistency and good test–retest reliability in children over a 2-week period (Costello & Angold, 1988). The SMFQ differentiates well between psychiatric and non-psychiatric subjects in a general population (Sharp, et al., 2006).

#### 3.4.2.3 *Nijmegen Motivation List (NML)*

The NML (Keijsers et al., 1999) was initially developed to assess treatment motivation in adults but has since been modified for use in children—the NML-child (NML-C) (Ollendick et al., 2009). The NML-C comprises 15 items rated on a 3-point scale, with statements such as “I believe this is the right treatment for me” and “I need help immediately to solve my problems.” Scores range from 0 = not at all true, 1 = partly true, to 2 = mostly true, with a maximum score of 30. Good internal consistency was obtained in the present sample ( $\alpha = 0.87$ ).

#### 3.4.2.4 *Depression and Anxiety Stress Scales (DASS)*

The DASS (Lovibond & Lovibond, 1995) was used to measure current parent self-rated symptoms of depression, anxiety, and stress. The DASS is a 42-item instrument consisting of three scales, each containing 14 items, which are scored on a 4-point scale (ranging from 0 = hardly ever to 3 = almost always), with a maximum score of 126. The DASS has demonstrated average to excellent psychometric qualities in clinical and community samples (Antony et al., 1998).

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### 3.4.2.5 *Strengths and Difficulties Questionnaire (SDQ)*

The SDQ (Goodman, 1997), parent version was used to assess the functional impairment of the youth's strengths and difficulties at inclusion (Goodman, 1999). The extended version of the SDQ (SDQ-Impact) used in this study, and described in Paper II, includes a parent impact supplement covering the severity of difficulties, the overall distress to the child, and the impairment from symptoms on the child's daily life, with a total of five items giving a possible score range of 0–10 (Goodman, 1999). The SDQ-Impact has been demonstrated as a significant predictor of clinical and non-clinical cases (Goodman, 1999).

The SDQ has shown moderate to strong internal reliability across all subscales, good test–retest reliability, and satisfactory external validity against clinical diagnoses (DSM-IV) (Stone et al., 2010; Vostanis, 2006). The SDQ has been validated in the Norwegian setting (Van Roy et al., 2008).

## 3.5 Statistical analyses

### 3.5.1 Power analyses

Prior to the RCT, power calculations were conducted for the main study involving comparisons of CBT (combined ICBT and GCBT) *versus* waitlist control and for comparing ICBT *versus* GCBT. Sample size estimation was based on a two-tailed *t*-test for the means, with expected effect sizes of 0.50 (medium) and 0.80 (large),  $\alpha$  value of 0.05, and power of 80%. The required sample size per cell was 26 to detect a large effect, and 64 to detect a medium effect. In the original sample included ( $N = 182$ ), the power was 90% to detect a medium effect, and 83.3% in the long-term sample ( $N = 139$ ).

### 3.5.2 Structural equation modeling (SEM)

SEM was used for all multilevel analyses, logistic regression analyses, growth curve models, and exploratory factor analyses (EFAs). SEM is an integration of the measurement (factor analysis) and structural (path analysis) approaches in a more generalized analytical framework (Wang & Wang, 2012). Thus, a full SEM model describes the relationships between observed variables and latent variables in the

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measurement part (confirmatory factor analysis) of the model and between the structural direct and indirect relationships among the latent variables (regression coefficients). The latent variable reflects a hypothesized construct. The possibility of analyzing both types of variables is a significant strength of SEM, as the structural relationships are adjusted for measurement loadings and errors. Residual or error terms represent the third class of variables in SEM. This class of measurement error or score unreliability variables can be associated with both observed and latent outcome variables (Kline, 2011). Whereas analysis of variance (ANOVA) or multiple regressions assume that independent variables are measured without error, this assumption is not made in SEM (unless specified). This gives more credible estimates in the analysis (Kline, 2011). Other strengths of SEM include the ability to test the overall model fit, testing of direct and indirect effects, and the ability to handle “difficult” data such as varying time series, non-normality, and censored data. These strengths have been utilized in the work presented in Papers I–III.

### **3.5.3 Attrition and missing data**

Attrition meaning loss of participants during follow-up is a particular concern in long-term studies, given that attrition can bias results and thus influence the validity and representativeness of findings. Only by keeping attrition to a minimum can such potential bias be properly controlled (Chambless & Hollon, 1998). However, retention of participants in long-term outcome studies is challenging (Nevo & Manassis, 2009), and the likelihood of attrition due to more systematic reasons during follow-up increases with time. Comparison of participants and non-participants is necessary to assess the comparability between these two groups and the generalizability of the investigated sample.

Missing data may result from more or less specific reasons which relate back to how missing data should be handled, and influence results and conclusions that might be drawn. Missing data can be classified into Rubin’s three categories (McKnight et al., 2007), i.e., missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR). “Random,” in the above sense, is understood as whether the missing value is randomly distributed or not.

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Assessment of missing data in the present study was relevant to the work presented in Papers I and II, in which the long-term outcomes of participants were analyzed. Data were first analyzed by missing value analysis using SPSS 22 (IBM Statistics, Chicago, IL, USA). Systematic patterns among included variables that might cause any lack of data were manually examined. Participants and non-participants were thus compared across all included pre-treatment variables, using chi-square test, Fischer's exact test, and logistic regression analysis. Furthermore, all included continuous measures were tested using Little's MCAR test. Given the assumption of MCAR or MAR was supported, the method of full information maximum likelihood (FIML) estimation was used for analyses of all available data (McKnight et al., 2007; Woithe, 2000). This method removes the necessity for list-wise deletion, thus preserving a maximum amount of information in the data matrix. The underlying assumption when using list-wise deletion is MCAR, while FIML assumes MAR. No empirical tests exist to test for MNAR *versus* MAR.

### **3.5.4 Multilevel analyses**

The study design was hierarchical and partially clustered, given the presence of units nested within one another (Bauer et al., 2008). The design included three levels: treatment site, treatment approach, and measurement waves within patients. Ordinary univariate and multivariate regression analysis assumes independence of observations within clusters. However, within clusters, correlations can arise from a number of sources, e.g., skill of group therapists, presence of domineering group members, or group attendance patterns. The mean number of participants at each of the seven clinics was 20 (range 10–25). Youth treated with GCBT were grouped into 16 separate treatment groups, whereas those treated with ICBT were grouped as one cluster at each clinic (hence a total of seven clusters), resulting in a total of 23 clusters. The design was therefore partially clustered, and all latent growth curve models and multivariate logistic regression analyses were adjusted to counter potential clustering effects (Baldwin, Bauer, Stice, & Rohde, 2011).

Outcome variables described in Papers I and II consisted of diagnostic and symptom measure outcomes, and included standard error corrections due to

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clustering. Diagnostic outcomes were dichotomous, consisting of loss of all inclusion anxiety diagnosis defined as complete recovery, and loss of the principal anxiety diagnosis defined as recovery. Diagnostic outcomes were analyzed using multivariate logistic regression analysis, in which potential predictors were chosen based on previously identified theoretical or empirical associations with the outcomes. The multivariate logistic models were controlled for age, gender, and pre-treatment CSR score for the principal anxiety diagnosis.

Latent growth curve modeling (LGM) was used for youth- and parent-rated anxiety and depressive symptoms (SCAS-C/P; SMFQ-C/P), as presented in Papers I and II. In the LGM models, four time points were included: pre-treatment, post-treatment, 1-year follow-up, and LTFU. To account for individually varying times of observation, random slopes for each participant were estimated (Muthén & Muthén, 2015). Unconditional models were first established to identify the underlying trajectory. Conditional models including predictors of level and change were then set up to explore effect differences. Growth rates and intercepts on CSR scores and symptom measures varied considerably between pre- and post-treatment. As a consequence, these variables were analyzed using piecewise LGM (p-LGM) (Wang & Wang, 2012), in which two distinct slopes modeled the trajectory change between pre- and post-treatment (slope 1) and the trajectory change between post-treatment and LTFU (slope 2). For analyses of predictors of symptom change described in Paper II, slope factors were regressed on the predictors to assess their respective influence on symptom change. Assessment of model fit was based on the Akaike information criterion (AIC), which combines estimation and model selection in a single conceptual framework, and the size adjusted Bayesian information criterion (SABIC; Yang, 2006). The latter is based on the same general information criterion but imposes more penalties for model complexity. Both criteria are parsimony-adjusted, meaning they favor simpler models. Thus, the model with the lowest score indicates relative better fit and fewer parameters, compared to competing models. Model fit was assessed using guidelines described by Kass and Raftery (1995) and assessment of theoretical model coherence (Wang & Wang, 2012). To account for non-normality present in the data, all analyses were run using a Maximum Likelihood

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estimator with Robust standard errors (MLR), which is robust to violations of non-normality (Muthén & Muthén, 2015).

### **3.5.5 Equivalence testing**

A statistically non-significant result between two treatment formats does not necessarily imply treatment equivalence, only that these results are not significantly different from each other. To test treatment equivalence between GCBT and ICBT, the confidence interval (CI) method was used (Rogers et al., 1993), whereby the researcher defines an interval in which results are within a “range of practical equivalence” (Kline, 2013). The analyses were based on the CSR scores for the principal anxiety diagnosis and youth- and parent-reported anxiety and depressive symptoms. An equivalence interval of 15% around a difference of zero was defined, with GCBT outcomes as the reference group. Differences small enough to fall within this equivalence interval were considered to be of little clinical and/or practical importance.

### **3.5.6 Exploratory factor analyses (EFAs)**

To investigate the presence of SOP subtypes presented in Paper III, separate EFAs of feared and avoided items (situations) were performed. SEM-based EFAs determined the number of continuous latent variables needed to explain the correlations among the observed variables. Subtypes were assumed to represent the underlying processes and dimensions of SOP (Moscovitch & Huyder, 2011), thus assuming correlations between the identified subtypes. Consequently, an oblique rotation was used. Ratings of avoidance for the 21 included items were binary, for which a weighted least squares means and variance estimator (WLSMV) was considered appropriate (Wang & Wang, 2012). The binary avoidance variables were estimated as tetrachoric correlations (Muthén & Muthén, 2015). This strengthens correlations and factor loadings to a further degree than if continuous indicator variables were assumed. Thus, this method provides better identification of factors and reduces the negative impact (unbiased) on the factor outcome of the avoidance variable.

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The fear items were rated continuously but demonstrated non-normal distributions, mainly due to “zero” answers (i.e., no fear score, as no fear was confirmed). To address such “zero” answers, a censored model was estimated using the MLR method (Muthén & Muthén, 2015). Assessment of model fit was based on AIC and SABIC scores and theoretical coherence (Kass & Raftery, 1995; Wang & Wang, 2012).

## 4. Results

### 4.1 Paper I: Long-term effectiveness of cognitive behavioral therapy for youth with anxiety disorders

In Paper I, the primary aim was to investigate the long-term outcomes of CBT in youth with anxiety disorders treated in community mental health clinics. The secondary aims were: (1) to investigate the effects of treatment formats (i.e., GCBT *versus* ICBT) on long-term outcomes, and (2) to assess for disorder-specific differences in treatment outcomes, for which outcomes in youth with a principal diagnosis of SOP were expected to be inferior to outcomes in those with a principal diagnosis of GAD and/or SAD.

At LTFU, 53% ( $n = 73$ ) of participants did not meet the criteria for any of their inclusion anxiety diagnosis, and 63% ( $n = 87$ ) did not meet the criteria for their principal anxiety diagnosis. Of the 102 youth who had not lost all inclusion anxiety diagnoses at post-treatment, 45% ( $n = 46$ ) recovered completely at LTFU. Of the 83 youth who had not lost their principal anxiety diagnosis at post-treatment, 53% ( $n = 44$ ) recovered at LTFU. Regarding continuous outcomes, there was a significant reduction in CSR scores for the principal, secondary, and tertiary anxiety diagnoses ( $p < 0.05$ ), as well as a significant reduction in symptom scores for all symptom measures, from pre-treatment to LTFU ( $p < 0.05$ ).

Analysis of the relationship between treatment response at post-treatment and at LTFU, based on changes in participants' CSR scores, revealed that 67 participants (48%) maintained their classification, 54 (39%) demonstrated further improvement (of whom 44 lost their principal diagnosis), and 18 (13%) worsened, i.e., re-qualified for their principal diagnosis.

At LTFU, Logistic regression analyses demonstrated no statistically significant differences in loss of all inclusion anxiety diagnosis and loss of principal anxiety diagnoses between ICBT and GCBT, with GCBT as the reference [49% *versus* 56%, odds ratio (OR) = 1.26, 95% CI (0.80, 2.01),  $p = 0.41$ ], or loss of principal inclusion anxiety diagnoses [59% *versus* 66%, OR = 1.29, 95% CI (0.85, 1.84),  $p = 0.50$ ]. p-LGM analyses showed no statistically significant differences between ICBT and

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GCBT in youth-rated anxiety symptoms ( $z = 0.86, p = 0.39$ ), parent-rated youth anxiety symptoms ( $z = 0.49, p = 0.63$ ), youth-rated depressive symptoms ( $z = 0.10, p = 0.92$ ), or parent-rated youth depressive symptoms ( $z = -1.28, p = 0.20$ ).

Equivalency between ICBT and GCBT at LTFU was established for the CSR outcome score of the participant's principal anxiety diagnosis [ $\pm 0.94$ ; 90% CI (-0.46, 0.71)]. Equivalency was not established for the symptom measure outcomes. Use of interim treatment during follow-up was not related to symptom or diagnostic outcomes.

With GAD as the reference, the OR for loss of the principal diagnosis at LTFU was lower for SOP [OR = 0.16, 95% CI (0.06, 0.44),  $p < 0.01$ ], but not for SAD [OR = 0.47, 95% CI (0.16, 1.34),  $p = 0.23$ ]. The ORs for loss of the respective principal anxiety diagnoses at LTFU were: SOP, OR = 0.27 [95% CI (0.15, 0.51),  $p < 0.01$ ]; SAD, OR = 1.88 [95% CI (0.99, 3.57),  $p = 0.11$ ]; and GAD, OR = 4.03 [95% CI (1.54, 10.56),  $p = 0.02$ ].

## **4.2 Paper II: Predictors of long-term effectiveness of cognitive behavioral therapy for youth with anxiety disorders**

In Paper II, the primary aim was to examine predictors of long-term treatment outcomes in youth with anxiety disorders treated with manualized CBT in community mental health clinics. Primary outcomes were loss of all inclusion anxiety diagnosis and loss of the principal inclusion anxiety diagnosis. Secondary outcomes were youth- and parent-rated youth anxiety change at LTFU.

Regarding loss of all anxiety diagnoses at LTFU, none of the youth variables was significantly related to remission. Low FSC was negatively associated with remission, compared to medium and high FSCs [OR = 0.07, CI (0.01, 0.55),  $p = 0.033$ ]. Loss of the principal inclusion anxiety diagnosis post-treatment was positively associated with loss of all inclusion anxiety diagnoses at LTFU [OR = 3.08, CI (1.78, 5.32),  $p = 0.001$ ]. The full model explained 25.9% of the outcome variance ( $p < 0.01$ ).

Regarding loss of the principal anxiety diagnosis at LTFU, the presence of a principal diagnosis of SOP at inclusion was negatively associated with outcome,

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compared to a principal diagnosis of GAD at inclusion [OR = 0.16, CI (0.05, 0.51),  $p = 0.010$ ]. Low FSC was negatively associated with loss of the principal anxiety diagnosis at LTFU [OR = 0.26, CI (0.09, 0.75),  $p = 0.036$ ]. Loss of the principal anxiety diagnosis post-treatment was positively associated with loss of the principal anxiety diagnosis at LTFU [OR = 2.60, CI (1.38, 4.90),  $p = 0.013$ ]. The full model explained 29.3% of the outcome variance ( $p < 0.001$ ).

Regarding youth-rated anxiety change at LTFU, treatment motivation was positively associated with symptom improvement at LTFU [ $\beta = -0.019$ , (SE) =  $-2.317$ ,  $p = 0.02$ ]. With regard to parent-rated youth anxiety change at LTFU, high parent-rated youth anxiety symptom severity at pre-treatment was negatively associated with parent-rated youth anxiety symptom improvement at LTFU ( $\beta = -0.003$ , SE =  $-2.057$ ,  $p = 0.04$ ).

The presence of SOP in the diagnostic profile at pre-treatment decreased the OR of loss of all anxiety diagnoses at LTFU [OR 0.72, 95% CI (0.59, 0.89),  $p < 0.01$ ], whereas the presence of any SOP in the diagnostic profile significantly improved the OR at LTFU [OR 1.28, 95% CI (1.07, 1.54),  $p = 0.03$ ]. GAD was not significantly associated with long-term outcomes [OR 1.06, 95% CI (0.99, 1.23),  $p = 0.21$ ]. Results also demonstrated similar significant associations in regard to loss of the principal anxiety diagnosis at LTFU (data not shown).

### **4.3 Paper III: Subtyping social anxiety in youth**

In Paper III, the primary aim was to empirically investigate subtypes of social anxiety in youth, based on a broad, established measure of social fear and avoidance, by assessing both youth's and parents' scores.

EFA of feared situations distinguished three distinct content-based subtypes of SOP in clinically referred youth, labeled "performance," "observation," and "interaction," representing three non-significantly correlated fear dimensions. Two participants exclusively met the criteria for the identified performance subtype, one qualified for the observation subtype, and two qualified exclusively for the interaction subtype. The factor analysis of avoidance provided a one-factor solution as the best fitting model, both conceptually and statistically.

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Analyses of associations between age and the identified fear and avoidance subtypes demonstrated significant and differing age-explained proportions of fear variances with the three subtypes: performance subtype:  $R^2_{adj} = 12.4$ ,  $F(1, 129) = 19.34$ ,  $p < 0.01$ ; interaction subtype:  $R^2_{adj} = 7.5$ ,  $F(1, 129) = 11.61$ ,  $p < 0.01$ ; and observation subtype:  $R^2_{adj} = 12.1$ ,  $F(1, 129) = 18.70$ ,  $p < 0.01$ . For all subtypes, older youth demonstrated higher fear scores than younger youth. Avoidance similarly increased with age ( $R^2_{adj} = 17.1$ ,  $F(1, 129) = 27.7$ ,  $p < 0.01$ ) and, compared to fear, showed a stronger association with age.

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## **5. General discussion**

The three papers presented in this thesis evaluated the long-term effectiveness of a CBT program for youth with mixed anxiety disorders in community mental health clinics and also examined predictors of long-term outcomes and characteristics of social anxiety disorder. In Paper I, results showed that long-term outcomes of CBT in youth with anxiety disorders treated in community clinics were improved, with recovery rates at LTFU comparable to those reported in efficacy trials. In Paper II, findings showed that both low FSC and a principal diagnosis of SOP were negatively associated with remission, whereas loss of the principal inclusion anxiety diagnosis post-treatment correlated positively with remission at LTFU. The work presented in Paper III identified three subtypes of SOP: “performance,” “observation,” and “interaction,” and factor structures differed between feared and avoided situations.

### **5.1 Long-term effectiveness of CBT for youth anxiety disorders**

As presented in Paper I, treatment outcome was defined as loss of all inclusion anxiety diagnoses (SAD, SOP, and GAD) and loss of the principal anxiety diagnosis. Secondary outcomes were change in youth- and parent-reported youth anxiety, change in depressive symptoms, and change in the CSR scores of the primary, secondary, and tertiary diagnoses. Results confirmed loss of all inclusion anxiety diagnoses and of the principal anxiety diagnosis in 53% and 63% of participants, respectively. Significant improvement was also evident in the anxiety symptom measures, but not in youth-rated depressive symptoms. Nearly 50% of youth that retained their principal and/or all inclusion anxiety diagnoses at post-treatment recovered at LTFU. Analysis of CSR scores related to participants’ principal diagnoses at post-treatment and LTFU overall indicated either maintenance or an improvement of the initial response at LTFU.

#### **5.1.1 Long-term effectiveness**

Initial expectations that long-term outcomes obtained in this effectiveness study would be inferior to long-term outcomes in efficacy studies were not

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consistently supported. Previous long-term efficacy studies reported loss of all inclusion anxiety disorders ranging between 47% and 86% (weighted mean rate 53%) over a mean follow-up period of 9.5 years post-treatment (Barrett et al., 2001; Benjamin et al., 2013; Ginsburg et al., 2014). In the present study, loss of all inclusion anxiety disorders was on par with these long-term efficacy study results, although within the lower range. Furthermore, results obtained in the present study on loss of the principal anxiety diagnosis (63%) are below the reported range of 65–90% from previous long-term efficacy studies (Ginsburg et al. 2014; Kendall et al. 2004). Also, a recent review of long-term outcomes in youth with any anxiety disorder (with the exception of post-traumatic stress disorder and obsessive–compulsive disorder) reported a mean outcome at 57% (range 47–68%) for loss of all anxiety disorders, and a mean outcome of 77% (range 48–93%) for loss of the principal anxiety diagnosis (Gibby et al., 2017). Although results in the present study fall within these ranges, they are lower than the mean outcomes reported.

Several reasons could explain why the long-term improvement rates from this study are slightly lower, compared to those from previous efficacy studies. In the present sample, CSR scores for the principal diagnosis at baseline were higher than those reported by other groups (mean CSR score = 7.01; Nauta et al., 2003; Wergeland et al., 2014). Also, lower CSR scores at pre-treatment reflect less severe anxiety disorders, which are more amenable to therapy, with patients thus more likely to remain in remission once effectively treated (Ginsburg et al., 2011). Moreover, the proportion of participants in the study here who presented with a principal diagnosis of SOP is around twice the population of youth with SOP included in other LTFU studies, e.g., 27.3% in Benjamin et al. (2013) and 21.2% in Barrett et al. (2001). This is of importance to explain the lower long-term improvement rates obtained in this study, since several previous studies of generic CBT protocols have associated SOP with poorer treatment outcomes (Hudson et al., 2015b; Reynolds et al., 2012). Finally, research clinic therapists commonly undergo more extensive training in the particular treatments provided and usually have more focused caseloads and are closely supervised, compared to therapists in community clinics—all factors likely to influence treatment outcomes (Smith et al., 2017; Weisz et al., 2015). The majority of

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therapists who participated in the present study had little or no experience in CBT prior to their participation, which may have contributed to the lower long-term improvement rates obtained here.

The present analyses revealed significant improvements between post-treatment and LTFU, confirming both maintenance *and* improvement of outcomes at LTFU, even after including significant treatment gains at post-treatment. Several explanations for this continued improvement may apply. Firstly, outcomes at post-treatment were in the lower range, compared to other effectiveness and efficacy trials (Bodden et al, 2008; James et al., 2015; Lau et al., 2010; Warwick et al., 2017), thus statistically leaving more room for improvement. Secondly, CSR scores related to the principal anxiety diagnosis and anxiety symptom change demonstrated steeper reductions from pre- to- post-treatment, compared to reductions from post-treatment to LTFU. Thus, the improvements may relate to a delayed treatment effect, which may stem from a prolonged consolidation of acquired skills by youth and their parents (Ishikawa, Okajima, Matsuoka, & Sakano, 2007). Of particular relevance, the treatment program used in this study consisted of ten weekly sessions, in contrast to mostly 12- to 16-session treatment programs in other studies (Bodden et al., 2008; Kendall et al., 1997). As a consequence, the treatment protocol in this study allowed limited time availability for CBT exposure, compared to other studies. It can be speculated whether youth had more time to implement and apply these skills after treatment, resulting in improved diagnostic outcomes. A final explanation may also be the effect of some spontaneous recovery among youth with anxiety disorders, as indicated by Nevo et al., (2014).

### **5.1.2 Effectiveness of ICBT *versus* GCBT**

As described in Paper I, no differences between ICBT and GCBT in long-term outcomes were found. Also, no significant interaction effect between time and treatment format was obtained, indicating that the rate of symptom reduction during LTFU was statistically similar for both treatment formats (i.e., ICBT and GCBT). This is in line with findings from meta-analyses of studies on short-term outcomes (In-Albon & Schneider, 2006; Silverman et al., 2008), as well as the long-term

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outcome efficacy study by Saavedra et al. (2010). Of interest on this point, comparable outcomes were also reported for ICBT and family CBT (Kendall et al., 2008). Some differences between ICBT and GCBT could have been expected, given that this study was conducted in community clinics, as opposed to research clinics, implying the differences in sample composition and treatment context posed by these different settings. Given that youth in community clinics present with multiple and more complex needs, more individualized and tailored treatment by ICBT could be expected to be superior to GCBT in this community setting (Southam-Gerow et al., 2008; Weisz et al., 2012). However, this was not the case here. Findings presented in Paper I established equivalency between ICBT and GCBT in terms of change in CSR scores for the principal anxiety diagnosis, although not for the other diagnostic and symptom outcome measures. Thus, the prediction of equivalence between treatment outcomes for ICBT *versus* GCBT was only partially confirmed.

### **5.1.3 Disorder-specific differences**

It was predicted that outcomes in youth with a principal diagnosis of SOP would be inferior to outcomes in those with a principal diagnosis of GAD and/or SAD. Results in Paper I indicated that the chance of loss of the principal diagnosis at long term was significantly lower for youth with a principal diagnosis of SOP. This was not the case with regard to loss of all inclusion anxiety disorders or to anxiety and depression symptom change. As such, these findings partially confirm the initial hypothesis and are in some agreement with results reported by Hudson et al. (2015b) and Crawley et al. (2008) demonstrating lower post-treatment outcomes following CBT in youth with SOP, compared to those with GAD and SAD. Interestingly, the ORs for recovery varied between post-treatment and LTFU, depending on the pre-treatment principal diagnosis. Whereas youth with GAD and SAD showed increased odds for loss of the principal diagnosis from post-treatment to LTFU, those with SOP carried a lower chance of recovery during this period. Thus, despite an initial positive response to treatment, the post-treatment outcome in participants with a principal diagnosis of SOP waned over time. Hudson et al. (2015b) suggested that generic CBT protocols might not be adequate to address the more specific characteristics

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associated with SOP such as negative self-statements and social expectations (Spence & Rapee, 2016). Furthermore, a meta-analysis reported larger effect sizes of disorder-specific treatments, compared to generic treatment, for anxiety disorders, and this was particularly the case for SOP (Reynolds et al., 2012). Thus, youth with SOP may need more extensive and more specialized treatment such as social effectiveness training (SET-C) (Beidel et al., 2000), a treatment program which has been shown to yield favourable 5-year post-treatment maintenance rates (80.08% loss of SOP diagnosis) (Beidel et al., 2006). As such, a shift towards more exposure initiated earlier in the course of treatment is likely to be conducive to outcome improvement (Ale, McCarthy, Rothschild, & Whiteside, 2015).

## **5.2 Predictors of long-term treatment outcomes**

Building on the results in Paper I, work presented in Paper II examined predictors of long-term outcomes. Treatment outcome was defined as loss of all inclusion anxiety diagnoses (SAD, SOP, and GAD), loss of the principal anxiety diagnosis, and anxiety symptom improvement. The most consistent finding was low FSC and the continued presence of the principal anxiety disorder at post-treatment as predictors of poorer diagnostic outcomes. Lower treatment motivation was associated with less youth-rated anxiety change, whereas higher levels of parent-rated youth anxiety at pre-treatment were associated with less parent-rated anxiety symptom change at LTFU. The presence of any SOP in the diagnostic profile at pre-treatment decreased the odds of loss of all anxiety diagnoses and the principal anxiety diagnosis at LTFU.

### **5.2.1 Predictors associated with outcome**

Previous long-term studies have identified low SES as a predictor of lower long-term recovery rates (Ginsburg et al., 2014; Kendall et al., 2004; Nevo et al., 2014), but not of short-term outcomes (Knight et al., 2014). Poorer long-term outcomes, as opposed to short-term outcomes, may be a result of the more pervasive influence of SES, directly and indirectly, on youth anxiety over time (Kessler et al., 2012; Najman et al., 2010). Also, FSC is likely a proxy for numerous factors

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affecting treatment benefits and changes such as lower caregiver support and involvement in the treatment (Weisz, et al., 2013b). The prevalence and interaction of underlying risk factors associated with social class (e.g., level of parental education or financial situation) may also be more prevalent and their interaction more extensive in a community clinic sample, thus affecting outcome, compared to what is observed in university clinics (Bradley & Corwyn, 2002; Villabø et al., 2013).

Post-treatment loss of the youth's principal diagnosis predicted the loss of all anxiety diagnoses and loss of the principal anxiety diagnosis at LTFU. This finding is in line with the study hypothesis, as well as with previous studies (Ginsburg et al., 2014), and confirms maintenance of post-treatment gains. It can be speculated that these youth continued to apply the skills learned during treatment and therefore continued to address their anxiety.

Similar to findings from Paper I, the presence of a principal diagnosis of SOP was related to poorer outcome in terms of loss of the principal anxiety diagnosis, including when the analysis was controlled for the other analyzed predictors. The results also demonstrated that the presence of any SOP in the diagnostic profile was associated with worse odds for loss of the principal anxiety diagnosis, as well as of all inclusion anxiety diagnoses. These findings lend further support to the results presented in Paper I and also incrementally add to evidence from previous long-term studies evaluating SOP as a predictor of outcome (Barrett et al., 2001; Benjamin et al., 2013; Kendall et al., 2004; Kerns et al., 2013b).

Youth treatment motivation was the only predictor significantly associated with youth-rated anxiety symptom change at LTFU. Higher youth motivation was associated with loss of the principal and all inclusion anxiety diagnoses in the original RCT (Wergeland et al., 2016). While the results in Paper II support this previous RCT finding, caution is warranted, given that the predictor was associated with only one outcome. From previous research, high motivation has been associated with therapeutic relationship and treatment outcome across developmental levels (Shirk & Karver, 2003), and treatment motivation has been associated with patient adherence and engagement in treatment, in turn associated with outcome (Drieschner et al., 2004; Lee et al., 2017). It can be speculated that youth who are more motivated at

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pre-treatment participate more actively in therapy, are more compliant with therapeutic activities, and thus are more likely to continue to apply learned skills, even after treatment completion. This could help explain, in the present study, the continued improvement of outcomes during follow-up.

High levels of parent-rated youth anxiety at inclusion were associated with less reduction on the parent-rated youth anxiety measure at follow-up, whereas youth self-reported anxiety did not predict long-term outcomes. This is in contrast to previous post-treatment findings in the original RCT which showed higher youth anxiety levels at inclusion to be associated with worse treatment outcomes (Wergeland et al., 2016). This finding is also in contrast to two previous long-term studies which reported an association between high inclusion anxiety levels and worse outcomes (Ginsburg et al., 2014; Manassis et al., 2004). Other long-term studies did not find an association between the inclusion anxiety level and outcomes (Kendall et al., 2004; Legerstee et al., 2010; Puleo & Kendall, 2011).

### **5.2.2 Predictors not associated with outcomes**

Parental psychopathology and family stresses were not associated with outcomes in the present study. Previous long-term studies have similarly shown no association between parental psychopathology and long-term outcomes (Ginsburg et al., 2014; Nevo et al., 2014). However, findings from short-term outcome studies indicated that parental psychopathology predicts worse youth diagnostic outcomes (Knight et al., 2014; Wergeland et al., 2016). In light of the finding of low FSC as a predictor, this result is somewhat surprising. Low SES has previously demonstrated a strong association with family stresses (Bradley & Corwyn, 2002). One possible reason behind this discrepancy may be related to socio-political characteristics of the country in which the study was performed. Norway is commonly characterized by high living standards and fairly homogenous economic and social stratification (Heiervang et al., 2007). Thus, families in this study found to be from a low FSC nonetheless have access to, for example, high-standard health-care services (mental and physical), safe and high-quality schools, free higher education, and fairly stable

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and safe neighborhoods with low crime rates—factors that, in other countries, could lead to stresses within the family (Bradley & Corwyn, 2002).

In this study, comorbidity and impairment from symptoms were not associated with outcomes. Previous long-term outcome studies have not found any association between pre-treatment comorbid disorders/symptoms and long-term anxiety outcomes (Kerns et al., 2013b; Manassis et al., 2004; Nevo et al., 2014; Wolk et al., 2016), with the exception of externalizing symptoms which have been associated with higher levels of anxiety at LTFU (Halldorsdottir & Ollendick, 2016). It was not possible to examine externalizing symptoms and/or disorder separately in the present study. However, at post-treatment, externalizing problems (i.e., conduct problems and hyperactive/inattention) were not associated with treatment outcomes (Wergeland et al., 2016).

### **5.3 Subtypes of social anxiety disorder in youth**

The work presented in Paper III identified three subtypes of SOP labeled “performance,” “observation,” and “interaction,” representing three non-significantly correlated fear dimensions. Factor analysis of avoidance provided a one-factor solution as the best fitting model, conceptually and statistically. Fear and avoidance seem to capture discrete aspects of SOP. The three subtypes demonstrated varying age associations, and age was also differentially associated with sum of feared situations and sum of avoided situations. Only two participants exclusively met the criteria for the performance subtype, thus posing a serious challenge to the validity and utility of this subtype as described in DSM-5.

Although the identified subtypes in this study are comparable to those identified in other youth studies (Cederlund & Öst, 2013; Piqueras et al., 2008), they are more in line with findings from previous adult studies (Bögels et al., 2010; Cox et al., 2008;). The discrepancy compared to other youth studies is most likely a result of methodological differences between studies related to different assessment instruments used and different population compositions. While subtype labels match adult findings, it is questionable if the specific fear content of the subtypes is comparable to the adult context. Thus, contextual differences between children and

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adults vary, as well as cultural, personal, developmental, and environmental factors, all influencing and contributing to the fears that a youth or an adult experiences in social situations (Spence & Rapee, 2016; Weems & Costa, 2005). This means that any comparison and application of a subtyping scheme across age groups must inevitably accommodate such differences in context and environment. The performance-only subtype, as defined in DSM-5 (American Psychiatric Association, 2013), seems to accommodate such content differences, and the findings from Paper III provide examples of situational characteristics that define this subtype for youth—writing on the chalkboard, giving a report or reading aloud in front of the class, answering questions in class, and delivering musical or athletic performances.

While the results in Paper III statistically supported the existence of a performance subtype in the sample, the utility of this subtype is questionable, given that only two participants exclusively met the criteria for this subtype. Previous studies also assessing the utility of the performance-only subtype obtained similar results, identifying very low numbers of youth qualifying for this subtype (Burstein et al., 2011; Kerns et al., 2013a). Regarding the observation and interaction subtypes, similarly low proportions of youth were found, thus also calling into question the utility of these subtypes. Furthermore, with such a limited degree of variance between individuals qualifying for the differing subtypes, it seems unlikely that subtypes may offer explanations for treatment outcomes in the clinical sample in this study.

A basic assumption in Paper III was that subtypes are not groupings of individuals but represent underlying characteristics or processes relating to maladaptive self-deficiency concerns. Recent theories of social anxiety state that a core defining feature of the disorder is a “distorted, negative view of self” denoted *core fears* (Moscovitch, 2009, p. 125) or described as maladaptive beliefs about the self (Spence and Rapee; 2016) regarding attributes and likeableness. These self-characteristics are perceived as deficient, at odds with perceived societal expectations and norms, and pose severe consequences to the individual if they are exposed (Moscovitch, 2009). These core fears fall into three broad correlated dimensions: (1) concerns about social competence, (2) concerns about physical appearance, and (3) concerns about revealing anxiety symptoms (Moscovitch & Huyder, 2011).

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Interestingly, the identified subtypes match the fear triggers and the fear domains, onto which these core concerns map: social competence – interaction subtype; physical appearance – observation subtype; revealing anxiety symptoms – performance subtype. Thus, it can be speculated that these core beliefs are the underlying processes resulting in the confirmed distribution of social anxiety subtypes identified in this study. Notably, the identified subtypes were not significantly correlated, which may also reflect upon the underlying core-fears. Thus, it may be speculated that individual insights and experiences within the specific subtypes, are not generalizable to the other subtypes.

The factor analysis of avoidance provided a uni-dimensional model as the best fitting model, conceptually and statistically. Given a high correlation between fear and avoidance, it would be expected that avoidance would follow the same factor structure as that identified with fear situations. However, this was not found to be the case, which, in turn, opens up to the interpretation that avoidance of social situations is not situationally bound but rather is better described as a behavior more or less present across feared social situations. Thus, the avoidance factor is more in line with a continuum model of social anxiety (in which sum of fear and avoidance predicts severity), whereas fear subtypes comply with a categorical perspective. This finding is relevant to the continuum *versus* categorical debate within the subtype discourse. The finding highlights that it is perhaps not a question of the eligibility of one perspective over the other, but rather *within* which *areas* a continuum *versus* categorical model can be best suited to describe and understand the heterogeneity of the disorder. In extension of this, and in line with general theory of fear and anxiety, the results provide evidence that avoidance is a generalizable behavior across feared situations, whereas feared situations seem to cluster into discrete domains (LeDoux, 2015; Spence & Rapee, 2016).

Results in Paper III also indicated that the sum of avoidance and fear both increase with age, although fear develops at differing rates within the different subtypes. This can also be interpreted as evidence that fear and avoidance tap into different aspects of SOP, and that fear and avoidance follow related, yet distinct, paths in relation to age. This is in congruence with previous research by Sumter et al.

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(2009) that demonstrated unique developmental paths of fear and avoidance within SOP subtypes. Rao et al. (2007) also suggested that different developmental paths of fear and avoidance relate to the youth's opportunity for avoidance, which they argue increases with higher age.

## **5.4 Study strengths**

The ATACA trial, of which this study is part, is one of the very few RCTs examining the effectiveness of CBT for youth with anxiety disorders in community mental health clinics. The trial included a relatively large sample population of routinely referred youths, and few exclusion criteria were applied. Treatment was delivered by clinicians working at the participating clinics, which covered both rural and urban catchment areas. As a result of a considerable amount of time and resources spent on contacting participants and setting up and conducting the follow-up assessments, high rates of long-term participation were obtained, which consequently helped to secure internal and external validity of the study. Taken together, the above factors contributed to a high degree of generalizability to other community mental health clinics.

The study applied a range of standardized measures with good to excellent psychometric qualities, and multiple informants were used in the assessments. Also, the inclusion of four assessment time points allowed for the use of advanced statistical models. As presented in Papers I and II, multilevel models were used to accommodate the dependency of the observation data, due to within-cluster correlations. If, on the other hand, independence of these observations were assumed, this would have increased the probability of type I errors. Also, the multilevel methods allowed for individually varying times of observation, and random slopes for each participant were estimated (Muthén & Muthén, 2015). All missing data were accommodated for by the FIML method, thus removing the necessity for list-wise deletion and preserving a maximum amount of information in the data matrix. These methodological and statistical choices allowed for more robust data reliability and closer tracking of symptom and diagnostic trajectories.

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## 5.5 Study limitations

### 5.5.1 Control group

An inherent limitation in most LTFU studies is the lack of a control group, which prohibits causal associations between treatment and outcomes, given that possible confounding variables may offer alternative explanations for the findings, such as interim treatment and maturation and life events during follow-up (Nevo & Manassis, 2009; Rith-Najarian et al., 2017). If the statistical modeling does not account for the confounder, a spurious association between the dependent variable and the independent variable will arise. This limitation is particularly relevant to long-term studies, since the long study duration entails a higher risk for confounding variables to influence outcome results. This is, in most cases, unavoidable, since it is not possible to control for all potential variables that might affect outcomes during the follow-up period. Furthermore, it is not ethically viable to withhold effective treatment from participants with anxiety disorders, not least given the documented long-term consequences of untreated disorders (Copeland et al., 2014).

Moreover, it is assumed that anxiety disorders tend to perpetuate themselves and do not remit spontaneously (Kendall & Ollendick, 2004), and epidemiological studies have suggested that childhood anxiety disorders are a potent risk factor for future anxiety disorders, as well as other psychiatric problems (Bittner et al., 2007; Copeland et al., 2013). However, in a recent LTFU study of treated anxiety disorders (8 years post-treatment), which also managed to include a control group, Nevo et al. (2014) found no significant difference in loss of all inclusion anxiety disorders between the CBT treatment group (50.0%) and the non-treatment group (48.1%). Despite the methodological limitations of their study, the authors argued the results provided speculative evidence that anxiety disorders in youth may remit spontaneously (Nevo et al., 2014). In light of this finding, spontaneous remission or maturational effects cannot be excluded as possible contributing factors to the continued outcome improvements reported in this present LTFU study.

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### **5.5.2 Interim service use**

Interim service use during follow-up is common in LTFU studies, with rates ranging between 42.6% and 93.9% (Benjamin et al., 2013; Ginsburg et al., 2014; Kendall et al., 2004). In the present study, interim treatment during the follow-up period was not an exclusion criterion, and a total of 27.3% of participants reported receiving further treatment for their anxiety disorder. Interim treatment is an obvious confounding factor with regard to long-term outcomes. As described in Papers I and II, several steps were taken to statistically control for the possible effect of interim service use on outcomes. Thus, all outcome analyses (i.e., loss of the principal anxiety diagnosis, loss of all inclusion anxiety diagnoses, youth- and parent-reported anxiety symptom change, youth- and parent-reported depression symptom change) were performed with and without participants using additional treatment. The exclusion of youth receiving additional treatment did not significantly affect results. Analyses in Paper II were also statistically controlled for interim service use. Furthermore, as presented in Paper I, subgroups identified at post-treatment consisting of participants who retained their principal diagnosis ( $n = 83$ ) and those who retained all their inclusion anxiety diagnoses ( $n = 102$ ) were examined in relation to the use of additional interim treatment. In both cases, this did not have a significant effect on long-term outcomes.

It might be speculated that interim service use could have affected other outcomes not included in the current study. However, this was not investigated. Furthermore, this study utilized a simple measure of interim service use, using a dichotomous answer format (yes/no), which excluded information on interim treatment type, length, or intensity. Thus, these aspects of further service use might have influenced the outcome differentially but were not analyzed.

### **5.5.3 Attrition**

Participant attrition is a threat to the generalizability of the findings if this loss of participants is due to systematic differences. The best approach to minimize this potential bias is to keep attrition to a minimum (Nevo & Manassis, 2009). Compared to other long-term studies of youth anxiety treatment, participation in the present

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follow-up was above the average retention rate of 63% of the original inclusion samples (range: 44–92%) (Barrett et al., 2001; Benjamin et al., 2013; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall et al., 2004). Furthermore, in terms of pre- and post-treatment variables, statistical tests revealed no significant differences between youth participating in the long-term study ( $N = 139$ ), compared to those from the original RCT who did not participate ( $n = 40$ ). However, systematic bias cannot be dismissed entirely, as variables not assessed in the study, e.g., negative life events during follow-up (Ginsburg et al., 2014), may have influenced participation.

#### **5.5.4 Measures**

The validity of using self-report measures on youth can be questioned. Age and experiences associated with growth and cognitive, social, and emotional development are all factors that may influence youth's responses (Kendall & Ollendick, 2004). Reports of treatment outcomes may vary between informants. In the present study, the impact of response bias was mitigated by using more than one informant (youth and parent), and also by using both categorical and dimensional measures to evaluate long-term treatment outcomes.

The NML (Keijsers et al., 1999) was initially developed to assess treatment motivation in adults but has since been modified for use in children—the NML-C (Ollendick et al., 2009). Although the reliability of the scale proved satisfactory, as shown in Paper II, the measure might not necessarily be appropriate for youth. From a developmental perspective, youth's appraisal of their own motivation, in the form of acknowledgment of the problem and the associated distress the problem creates and their willingness to face these difficulties, is likely different from adults. Further work to assess the validity of this scale would help to confirm its appropriateness for youth or whether it should be modified accordingly.

Furthermore, the use of the ADIS-C/P interview was limited to the SAD, SOP, and GAD modules. As a consequence, differential diagnoses and comorbidity based on the full ADIS-C/P interview could not be assessed. Thus, previously reported reliability and validity assessments of the full interview may not apply. Assessment

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of comorbidity and demographic information was based on the DAWBA interview, which was already in use as a routine part of the intake procedures at the participating clinics. The choice to use the DAWBA interview and the SAD, SOP, and GAD modules of the ADIS-C/P interview was therefore based on pragmatic considerations and also to reduce the burden on the participants, given that both types of interview are extensive and time-consuming.

The DAWBA interview was completed at pre-treatment but was not used in the LTFU, while the ADIS-C/P interview was limited to the SAD, SOP, and GAD modules. Therefore, the study did not include any assessments of youth comorbidity or of differential diagnoses at LTFU, which consequently hindered the assessment and tracking of comorbid disorders throughout the study.

### **5.5.5 Selection bias and representativeness of the study sample**

Recruitment procedures and representativeness of the study sample are central to the internal and external validity of a study. If selected participants demonstrate systematic differences from those not selected, this poses a threat to the internal validity of the study. In the study, such selection bias would occur if the participating youth differed significantly from eligible non-participants. While all potential eligible participants should have been informed of the study during routine intake at the participating clinics, it is possible that some eligible participants were not given the opportunity to participate due to various reasons, including failure to recognize anxiety as the primary problem in the youth or the youth being considered in need of immediate treatment. At long-term follow-up, a number of youth declined to participate. Systematic differences may have characterized this group, in comparison to those who chose to participate, e.g., more complex symptomatology, greater fear of being observed (performance-specific social anxiety), or lower motivation. This may have implications regarding the generalizability of the findings. Analyses were run, that demonstrated no difference between youth participating and not participating in the LTFU. However, possible differences between these groups may still have been present, which were not examined.

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The study took place in Norway, which may also influence the generalizability of the results. Community mental health-care services are free of charge for all youth in Norway. In comparison, many university-based research clinics (the setting for most efficacy studies) charge a service fee, based on household income (Villabø et al., 2013). This could contribute to systematic differences regarding which youth choose to seek treatment, which, in turn, may also affect comparability between studies. Furthermore, typical of many Norwegian community samples, the sample population in this study was primarily Caucasian (Nilsen et al., 2013). Thus, findings may not apply to other ethnic groups. Also, Norway is commonly characterized by high living standards and fairly homogenous economic and social stratification (Heiervang et al., 2007). Coupled with extenuating factors such as a high level of free social welfare services, mid-level social class in Norway may be considered as high social class in other countries. Hence, mid-level and high FSCs were combined in the work presented in Paper II, while low FSC was retained (changing the variable from ordinal to binary). While the generally high social stratification of the sample population may limit the generalizability of the present findings to youth groups within other socioeconomic strata, combining mid-level and high social classes into one group also reduces the variance of this particular variable. This may have affected the association with outcome.

### **5.5.6 Generalizability of the clinical setting**

The seven public child and adolescent mental health outpatient clinics in the study are part of the public health-care system in Norway, and similar clinics are found across Norway. To what degree these clinics at an organizational and systems-level are comparable to, and representative of, community mental health clinics in other countries is uncertain (Southam-Gerow et al., 2012). Furthermore, the clinics are not specialized in delivering treatment of specific disorders or in therapy orientation. As such, this particular characteristic may be more comparable to other community mental health clinics, which similarly must attend to multiple mental health issues in the population under differing regulatory incentives, and as a consequence often cannot afford therapist treatment specialization (Weisz et al.,

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2013b). However, in the present study, steps were taken to ensure adherence and competence in treatment delivery that may be more representative of efficacy trials (Kendall & Beidas, 2007). More specifically, therapists delivering CBT treatment (ICBT and GCBT) throughout the study attended two 2-day workshops on CBT and the *FRIENDS for life* program, and treated two pilot cases approved by supervisors before study start. During the active treatment phase, therapists attended four additional 2-day workshops on topics related to anxiety disorders in youth, and received treatment supervision every 2–4 weeks by FRIENDS-licensed CBT trainers. Video recordings from interview sessions were reviewed under supervision. Finally, therapists delivering treatment were all volunteers, which may be assumed to be because of their positive attitudes towards the treatment program. It is uncertain if this level of therapist training and supervision and therapist attitudes are representative of, or applicable to, community clinic practice outside research trial settings (Southam-Gerow et al., 2012; Weisz et al., 2013b).

### **5.5.7 Specific methodological considerations for Paper III**

The generalizability of the identified factor structures should be considered in light of several limitations. Results in Paper III were obtained from SEM-based EFAs. Although SEM is generally regarded as a method for large sample sizes, there is, however, no absolute standards (Kline, 2011). Recommendations in the literature indicate an adequate sample size for this type of analysis to be in the range of  $N = 100\text{--}200$  (Wang & Wang, 2012). The EFA described in Paper III was based on a sample size of 131, which could explain why the statistical power of the analysis might be somewhat reduced. Further studies are needed to confirm the identified factor structures.

Generalizations of the findings beyond populations similar to the study sample of treatment-seeking youth in this study may not apply. As noted in Paper III, the mean CSR score for SOP in the selected population was high (CSR score = 6.7, SD = 1.3). It is possible that the severity of the cases is also a reflection of how generalized the social anxiety disorder is across fear situations. Thus, participants with less severe anxiety may have represented more “specific” cases of social anxiety, which, in turn,

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may have categorized them within only one of the identified subtypes. As a consequence, more participants with distinct subtypes would have been identifiable. Following on from this, the clinical utility of SOP subtypes may be greater among less severe cases of the disorder. Further research is needed to assess if the identified factor structures are generalizable to other samples.

Concerning assessment of the conceptually best fitting model in regard to both fear and avoided situations, this assessment relies, in some part, on interpretation of item commonalities and factor coherence. It was assessed that avoidance is best represented by one factor, as the two-factor solution proved difficult to interpret. However, this assessment and the conclusions drawn from it should be considered with caution, given that other interpretations are possible.

Measurement bias may be present in the work described in Paper III, due to specific features of the ADIS-C/P interview. The ADIS-C/P interview assesses avoidance of social situations when fear of a social situation is rated “4” or above. As a consequence, some avoided situations might not have been assessed, given that the fear rating was below the cutoff. Furthermore, it cannot be ruled out that a given situation had a low fear rating because the situation was, in fact, avoided. Thus, this is an inherent limitation in the ADIS-C/P interview, which may have affected the study results.

## **5.6 Clinical implications**

This study demonstrated long-term effectiveness of CBT for youth with mixed anxiety disorders treated in community clinics. These findings provide encouragement for the wider use and implementation of CBT in community mental health clinics. While a community setting differs from a university clinic setting in many respects, and thus may be assigned responsibility for slightly lower treatment outcomes, from a long-term perspective, the study results indicate that the impact of these differences on treatment outcomes might be overestimated.

Furthermore, the comparable outcomes for ICBT and GCBT allow practitioners flexibility in the choice of treatment format when treating youth with SAD, SOP, and /or GAD. As a consequence, choice of treatment format is not

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dependent upon youth clinical factors but can be based on patient or parent preferences, community clinic resources, or referral rates.

While the study findings lend support to the suitability of the treatment approach in the community setting, a significant number of youth in the study still met the criteria for an anxiety diagnosis at LTFU. Several predictors were found to characterize youth with poorer outcomes. Youth with a principal diagnosis of SOP, or indeed with any SOP, at pre-treatment demonstrated poorer outcomes with regard to loss of the principal anxiety diagnosis and all inclusion anxiety disorders. There is still limited knowledge of the specific mechanisms underlying these poorer results. However, clinicians treating youth with SOP should be cautious in using a generic treatment protocol and should consider specific CBT for the disorder (Beidel et al., 2006; Öst et al., 2017). Also, targeting specific subtypes might enhance outcomes, since treatment gains are most likely not generalizable across the subtypes.

Low FSC was identified as a predictor of worse outcomes. This may indicate the need for adjustments of, and/or additions to, the treatment protocol in the form of parent psychoeducation on risk factors associated with low FSC and/or interventions towards related parenting responses (Ginsburg et al., 2008; Lawrence et al., 2017). Careful and broad assessment at inclusion to identify those youths and families at risk for worse treatment outcomes is important, including identification of possible underlying stressors (e.g., family financial situation, stressful life situation) (Bradley & Corwyn, 2002).

Given the positive association between youth pre-treatment motivation and better outcomes, motivational interviewing at pre-treatment may help to improve long-term treatment outcomes (Westra et al., 2016). Furthermore, a positive youth response at post-treatment may be used as an indicator of the need to plan adjustments to the standard treatment protocol for these youth, e.g., increasing the number of treatment sessions or the frequency of post-treatment “booster” sessions, so as to increase the probability of improved long-term outcomes (Gibby et al., 2017).

More specifically, in regard to assessment of social anxiety disorder, it may be important to assess avoidance separately from fear, given that youth with anxiety problems may under-report their fears because they consistently avoid feared

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situations. Assessing avoided situations independently from feared situations, e.g., as separate domains in an interview or with different questionnaires, may elicit this information for better targeted treatment. Also, it seems questionable if the performance-only subtype is of much utility in a clinical population.

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## 6. Conclusions

The study findings presented in this thesis demonstrate the long-term effectiveness of CBT for youth with mixed anxiety disorders treated in community mental health clinics. Treatment effects were on par with those from previous long-term efficacy studies, and outcome improvement was obtained during follow-up. ICBT and GCBT yielded similar results, and high pre-treatment motivation and post-treatment recovery were associated with better long-term outcomes. Some youth factors were associated with poorer treatment outcomes, including a social anxiety disorder and low family social class. This highlights the importance of careful assessment to identify youth at risk for poorer long-term outcomes, so that enhanced or adapted treatments may be offered these youth which again may help to improve long-term remission. In this regard, the utility of social anxiety subtypes seems limited, although differential assessment of fear and anxiety may be helpful in providing additional information on situations youth fear and avoid, thus allowing for more targeted treatment. Future research should strive to include a control group during follow-up or to examine additional factors during follow-up that might affect outcomes, so as to gain a more detailed picture of the effects of CBT treatment. Also, future studies should endeavor to examine the influence of process factors on the long-term outcomes of CBT treatment for youth with mixed anxiety disorders.

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## 7. References

- Aderka, I. M., Nickerson, A., & Hofmann, S. G. (2012). Admixture analysis of the diagnostic subtypes of social anxiety disorder: Implications for the DSM-V. *Journal of Behavior Therapy and Experimental Psychiatry*, **43**, 752–757.
- Ale, C. M., McCarthy, D. M., Rothschild, L. M., & Whiteside, S. P. (2015). Components of cognitive behavioral therapy related to outcome in childhood anxiety disorders. *Clinical Child and Family Psychology Review*, **18**, 240–251.
- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual (DSM-IV, 1994)*. American Psychiatric Association: Washington, DC.
- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual—text revision (DSM-IV-TRim, 2000)*. American Psychiatric Association: Washington, DC.
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5<sup>®</sup>)*. American Psychiatric Association: Washington, DC.
- Angold, A., Costello, E. J., & Erkanli, A. (1999). Comorbidity. *Journal of Child Psychology and Psychiatry*, **40**, 57-87.
- Angold, A., Costello, E. J., Messer, S. C., & Pickles, A. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, **5**, 237-249.
- Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*, **10**, 176.
- Baldwin, S. A., Bauer, D. J., Stice, E., & Rohde, P. (2011). Evaluating models for partially clustered designs. *Psychological Methods*, **16**, 149–165.
- Barrett, P. M. (2005). *FRIENDS for life: Group leaders manual for youth*. Brisbane: Australian Academic Press.
-



- Barrett, P. M., Dadds, M. R., & Rapee, R. M. (1991). *Coping Koala Workbook*. Unpublished manuscript. School of Applied Psychology, Griffith University: Nathan.
- Barrett, P. M., Dadds, M. R., & Rapee, R. M. (1996). Family treatment of childhood anxiety: A controlled trial. *Journal of Consulting and Clinical Psychology*, **64**, 333–342.
- Barrett, P. M., Duffy, A. L., Dadds, M. R., & Rapee, R. M. (2001). Cognitive-behavioral treatment of anxiety disorders in children: Long-term (6-year) follow-up. *Journal of Consulting and Clinical Psychology*, **69**, 135–141.
- Barrington, J., Prior, M., Richardson, M., & Allen, K. (2005). Effectiveness of CBT versus standard treatment for childhood anxiety disorders in a community clinic setting. *Behaviour Change*, **22**, 29–43.
- Bauer, D. J., Sterba, S. K., & Hallfors, D. D. (2008). Evaluating group-based interventions when control participants are ungrouped. *Multivariate Behavioral Research*, **43**, 210–236.
- Beidel, D. C., Turner, S. M., & Morris, T. L. (2000). Behavioral treatment of childhood social phobia. *Journal of Consulting and Clinical Psychology*, **68**, 1072–1080.
- Beidel, D. C., Turner, S. M., & Young, B. J. (2006). Social effectiveness therapy for children: Five years later. *Behavior Therapy*, **37**, 416–425.
- Benjamin, C. L., Harrison, J. P., Settapani, C. A., Brodman, D. M., & Kendall, P. C. (2013). Anxiety and related outcomes in young adults 7 to 19 years after receiving treatment for child anxiety. *Journal of Consulting and Clinical Psychology*, **81**, 865–876.
- Bittner, A., Egger, H. L., Erkanli, A., Jane Costello, E., Foley, D. L., & Angold, A. (2007). What do childhood anxiety disorders predict? *Journal of Child Psychology and Psychiatry*, **48**, 1174–1183.
- Bjaastad, J. F., Haugland, B. S. M., Fjermestad, K. W., Torsheim, T., Havik, O. E., Heiervang, E. R., & Öst, L.-G. (2016). Competence and Adherence Scale for Cognitive Behavioral Therapy (CAS-CBT) for anxiety disorders in youth:
-

- 
- psychometric properties. *Psychological Assessment*, **28**, 908–916. doi: 10.1037/pas0000230.
- Blote, A. W., Miers, A. C., Heyne, D. A., Clark, D. M., & Westenberg, P. (2014). The relation between social anxiety and audience perception: Examining Clark and Wells' (1995) model among adolescents. *Behavioural and Cognitive Psychotherapy*, **42**, 555-567.
- Bodden, D. H., Bögels, S. M., Nauta, M. H., et al. (2008). Child versus family cognitive-behavioral therapy in clinically anxious youth: An efficacy and partial effectiveness study. *Journal of the American Academy of Child and Adolescent Psychiatry*, **47**, 1384–1394.
- Bögels, S. M., Alden, L., Beidel, D. C., et al. (2010). Social anxiety disorder: Questions and answers for the DSM-V. *Depression and Anxiety*, **27**, 168–189.
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, **53**, 371–399.
- Brown, T. A., Barlow, D. H., & Di Nardo, P. A. (1994). *Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV): Client Interview Schedule*. Graywind Publications Incorporated: San Antonio, TX.
- Brown, T. A., Di Nardo, P. A., Lehman, C. L., & Campbell, L. A. (2001). Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *Journal of Abnormal Psychology*, **110**, 49–58.
- Burstein, M., He, J. P., Kattan, G., Albano, A. M., Avenevoli, S., & Merikangas, K. R. (2011). Social phobia and subtypes in the National Comorbidity Survey–Adolescent Supplement: Prevalence, correlates, and comorbidity. *Journal of the American Academy of Child and Adolescent Psychiatry*, **50**, 870–880.
- Caporino, N. E., Herres, J., Kendall, P. C., & Wolk, C. B. (2016). Dysregulation in youth with anxiety disorders: Relationship to acute and 7- to 19-year follow-up outcomes of cognitive-behavioral therapy. *Child Psychiatry and Human Development*, **47**, 539–547.
- Cederlund, R., & Öst, L.-G. (2013). Psychometric properties of the Social Phobia and Anxiety Inventory–Child version in a Swedish clinical sample. *Journal of Anxiety Disorders*, **27**, 503–511.
-

- Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*, 7–18.
- Chorpita, B. F., & Weisz, J. R. (2009). *Modular Approach to Therapy for Children With Anxiety, Depression, Trauma, or Conduct Problems (MATCH-ADTC)*. PracticeWise, LLC: Satellite Beach, FL.
- Chu, B. C., Skriner, L. C., & Zandberg, L. J. (2013). Shape of change in cognitive behavioral therapy for youth anxiety: Symptom trajectory and predictors of change. *Journal of Consulting and Clinical Psychology, 81*, 573–587.
- Clark, D. M., & Wells, A. (1995). *A Cognitive Model of Social Phobia*. Guilford Press: New York, NY.
- Comer, J. S., & Kendall, P. C. (2004). A symptom-level examination of parent–child agreement in the diagnosis of anxious youths. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*, 878–886.
- Compton, S. N., Peris, T. S., Almirall, D., et al. (2014). Predictors and moderators of treatment response in childhood anxiety disorders: Results from the CAMS trial. *Journal of Consulting and Clinical Psychology, 82*, 212–224.
- Copeland, W. E., Adair, C. E., Smetanin, P., et al. (2013). Diagnostic transitions from childhood to adolescence to early adulthood. *Journal of Child Psychology and Psychiatry, 54*, 791–799.
- 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., & Angold, A. (1988). Scales to assess child and adolescent depression: checklists, screens, and nets. *Journal of the American Academy of Child & Adolescent Psychiatry, 27*, 726–737.
- Costello, E. J., Egger, H. L., & Angold, A. (2005). The developmental epidemiology of anxiety disorders: Phenomenology, prevalence, and comorbidity. *Child and Adolescent Psychiatric Clinics of North America, 14*, 631–648.
- Cox, B. J., Clara, I. P., Sareen, J., & Stein, M. B. (2008). The structure of feared social situations among individuals with a lifetime diagnosis of social anxiety
-

- 
- disorder in two independent nationally representative mental health surveys. *Behaviour Research and Therapy*, **46**, 477–486.
- Crawley, S. A., Beidas, R. S., Benjamin, C. L., Martin, E., & Kendall, P. C. (2008). Treating socially phobic youth with CBT: Differential outcomes and treatment considerations. *Behavioural and Cognitive Psychotherapy*, **36**, 379–389.
- Currie, C., Molcho, M., Boyce, W., Holstein, B., Torsheim, T., & Richter, M. (2008). Researching health inequalities in adolescents: The development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. *Social Science and Medicine*, **66**, 1429–1436.
- Dalrymple, K., & D'Avanzato, C. (2013). Differentiating the subtypes of social anxiety disorder. *Expert Review of Neurotherapeutics*, **13**, 1271–1283.
- de Groot, J., Cobham, V., Leong, J., & McDermott, B. (2007). Individual versus group family-focused cognitive-behaviour therapy for childhood anxiety: Pilot randomized controlled trial. *Australian and New Zealand Journal of Psychiatry*, **41**, 990–997.
- Drieschner, K. H., Lammers, S. M., & van der Staak, C. P. (2004). Treatment motivation: An attempt for clarification of an ambiguous concept. *Clinical Psychology Review*, **23**, 1115–1137.
- Ehrenreich-May, J., Southam-Gerow, M. A., Hourigan, S. E., Wright, L. R., Pincus, D. B., Weisz, J. R. (2011). Characteristics of anxious and depressed youth seen in two different clinical contexts. *Administration and Policy in Mental Health and Mental Health Services Research*. **38**, 398-411
- Ezpeleta, L., Keeler, G., Erkanli, A., Costello, E. J., & Angold, A. (2001). Epidemiology of psychiatric disability in childhood and adolescence. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, **42**, 901–914.
- Flannery-Schroeder, E., Choudhury, M., & Kendall, P. (2005). Group and individual cognitive-behavioral treatments for youth with anxiety disorders: 1-year follow-up. *Cognitive Therapy and Research*, **29**, 253–259.
- Flannery-Schroeder, E., Suveg, C., Safford, S., Kendall, P. C., & Webb, A. (2004). Comorbid externalising disorders and child anxiety treatment outcomes. *Behaviour Change*, **21**, 14–25.
-

- Ford, T., Goodman, R., & Meltzer, H. (2003). The British Child and Adolescent Mental Health Survey 1999: The prevalence of DSM-IV disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, **42**, 1203–1211.
- Garcia-Lopez, L.-J., Olivares, J., Beidel, D., Albano, A.-M., Turner, S., & Rosa, A. I. (2006). Efficacy of three treatment protocols for adolescents with social anxiety disorder: A 5-year follow-up assessment. *Journal of Anxiety Disorders*, **20**, 175–191.
- Gibby, B. A., Casline, E. P., & Ginsburg, G. S. (2017). Long-term outcomes of youth treated for an anxiety disorder: A critical review. *Clinical Child and Family Psychology Review*, **20**, 201–225.
- Ginsburg, G. S., Becker, E. M., Keeton, C. P., et al. (2014). Naturalistic follow-up of youths treated for pediatric anxiety disorders. *JAMA Psychiatry*, **71**, 310–318.
- Ginsburg, G. S., Kendall, P. C., Sakolsky, D., et al. (2011). Remission after acute treatment in children and adolescents with anxiety disorders: findings from the CAMS. *Journal of Consulting and Clinical Psychology*, **79**, 806–813.
- Ginsburg, G. S., Becker, K. D., Kingery, J. N., & Nichols, T. (2008). Transporting CBT for childhood anxiety disorders into inner-city school-based mental health clinics. *Cognitive and Behavioral Practice*, **15**, 148–158.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, **38**, 581–586.
- Goodman, R. (1999). The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness and consequent burden. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, **40**, 791–799.
- Goodman, R., Ford, T., Richards, H., Gatward, R., & Meltzer, H. (2000). The Development and Well-Being Assessment: Description and initial validation of an integrated assessment of child and adolescent psychopathology. *Journal of Child Psychology and Psychiatry*, **41**, 645–655.
- Halldorsdottir, T., & Ollendick, T. H. (2016). Long-term outcomes of brief, intensive CBT for specific phobias: The negative impact of ADHD symptoms. *Journal of Consulting and Clinical Psychology*, **84**, 465–471.
-

- 
- Heiervang, E., Stormark, K. M., Lundervold, A. J., et al. (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.
- Heimberg, R. G., Horner, K. J., Juster, H. R., et al. (1999). Psychometric properties of the Liebowitz Social Anxiety Scale. *Psychological Medicine*, **29**, 199–212.
- Higa-McMillan, C. K., Francis, S. E., Rith-Najarian, L., & Chorpita, B. F. (2016). Evidence base update: 50 years of research on treatment for child and adolescent anxiety. *Journal of Clinical Child and Adolescent Psychology*, **45**, 91–113.
- Hofmann, S. G., Heinrichs, N., & Moscovitch, D. A. (2004). The nature and expression of social phobia: Toward a new classification. *Clinical Psychology Review*, **24**, 769–797.
- Holt, C. S., Heimberg, R. G., Hope, D. A., & Liebowitz, M. R. (1992). Situational domains of social phobia. *Journal of Anxiety Disorders*, **6**, 63–77.
- Hook, J. N., Valentiner, D. P., & Connelly, J. (2013). Performance and interaction anxiety: Specific relationships with other- and self-evaluation concerns. *Anxiety Stress and Coping*, **26**, 203–216.
- Hudson, J. L., Keers, R., Roberts, S., et al. (2015a). Clinical predictors of response to cognitive-behavioral therapy in pediatric anxiety disorders: The Genes for Treatment (GxT) Study. *Journal of the American Academy of Child and Adolescent Psychiatry*, **54**, 454–463.
- Hudson, J. L., Rapee, R. M., Lyneham, H. J., McLellan, L. F., Wuthrich, V. M., & Schniering, C. A. (2015b). Comparing outcomes for children with different anxiety disorders following cognitive behavioural therapy. *Behaviour Research and Therapy*, **72**, 30–37.
- Hunsley, J. (2007). Addressing key challenges in evidence-based practice in psychology. *Professional Psychology: Research and Practice*, **38**, 113–121.
- Hunsley, J., & Lee, C. M. (2007). Research-informed benchmarks for psychological treatments: Efficacy studies, effectiveness studies, and beyond. *Professional Psychology: Research and Practice*, **38**, 21–33.
-

- 
- In-Albon, T., & Schneider, S. (2006). Psychotherapy of childhood anxiety disorders: A meta-analysis. *Psychotherapy and Psychosomatics*, **76**, 15–24.
- Ishikawa, S. I., Okajima, I., Matsuoka, H., & Sakano, Y. (2007). Cognitive Behavioural Therapy for Anxiety Disorders in Children and Adolescents: A Meta-Analysis. *Child and Adolescent Mental Health*, **12**, 164–172. doi: 10.1111/j.1475-3588.2006.00433.x
- James, A., Soler, A., & Weatherall, R. (2005). Cognitive behavioural therapy for anxiety disorders in children and adolescents. *Cochrane Database of Systematic Reviews*, **4**, CD004690.
- James, A. C., James, G., Cowdrey, F. A., Soler, A., & Choke, A. (2013). Cognitive behavioural therapy for anxiety disorders in children and adolescents. *Cochrane Database of Systematic Reviews*, **6**, CD004690.
- James, A. C., James, G., Cowdrey, F. A., Soler, A., & Choke, A. (2015). Cognitive behavioural therapy for anxiety disorders in children and adolescents. *Cochrane Database of Systematic Reviews*, **2**, CD004690.
- Kass, R. E., & Raftery, A. E. (1995). Bayes factors. *Journal of the American Statistical Association*, **90**, 773–795.
- Keijsers, G. P. J., Schaap, C. P. D. R., Hoogduin, C., Hoogsteyns, B., & de Kemp, E. C. M. (1999). Preliminary results of a new instrument to assess patient motivation for treatment in cognitive-behaviour therapy. *Behavioural and Cognitive Psychotherapy*, **27**, 165–179.
- Kendall, P. C. (1990). *Coping Cat Workbook*. Workbook Publishing: Ardmore, PA.
- Kendall, P. C. (1994). Treating anxiety disorders in children: Results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology*, **62**, 100–110.
- Kendall, P. C., & Beidas, R. S. (2007). Smoothing the trail for dissemination of evidence-based practices for youth: Flexibility within fidelity. *Professional Psychology: Research and Practice*, **38**, 13–20.
- Kendall, P. C., Comer, J. S., Marker, C. D., et al. (2009). In-session exposure tasks and therapeutic alliance across the treatment of childhood anxiety disorders. *Journal of Consulting and Clinical Psychology*, **77**, 517–525.
-

- 
- Kendall, P. C., Flannery-Schroeder, E., Panichelli-Mindel, S. M., Southam-Gerow, M., Henin, A., & Warman, M. (1997). Therapy for youths with anxiety disorders: A second randomized clinical trial. *Journal of Consulting and Clinical Psychology, 65*, 366–380.
- Kendall, P. C., Hudson, J. L., Gosch, E., Flannery-Schroeder, E., & Suveg, C. (2008). Cognitive-behavioral therapy for anxiety disordered youth: A randomized clinical trial evaluating child and family modalities. *Journal of Consulting and Clinical Psychology, 76*, 282–297.
- Kendall, P. C., & Ollendick, T. H. (2004). Setting the research and practice agenda for anxiety in children and adolescence: A topic comes of age. *Cognitive and Behavioral Practice, 11*, 65–74.
- Kendall, P. C., Safford, S., Flannery-Schroeder, E., & Webb, A. (2004). Child anxiety treatment: Outcomes in adolescence and impact on substance use and depression at 7.4-year follow-up. *Journal of Consulting and Clinical Psychology, 72*, 276–287.
- Kendall, P. C., & Southam-Gerow, M. A. (1996). Long-term follow-up of a cognitive-behavioral therapy for anxiety-disordered youth. *Journal of Consulting and Clinical Psychology, 64*, 724–730.
- Kerns, C. E., Comer, J. S., Pincus, D. B., & Hofmann, S. G. (2013a). Evaluation of the proposed social anxiety disorder specifier change for DSM-5 in a treatment-seeking sample of anxious youth. *Depression and Anxiety, 30*, 709–715.
- Kerns, C. M., Read, K. L., Klugman, J., & Kendall, P. C. (2013b). Cognitive behavioral therapy for youth with social anxiety: Differential short and long-term treatment outcomes. *Journal of Anxiety Disorders, 27*, 210–215.
- Kessler, R. C., Avenevoli, S., Costello, E. J., et al. (2012). Prevalence, persistence, and sociodemographic correlates of DSM-IV disorders in the National Comorbidity Survey Replication Adolescent Supplement. *Archives of General Psychiatry, 69*, 372–380.
- Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*, third edition. Guildford: New York, NY.]
-



- Kline, R. B. (2013). *Beyond Significance Testing: Statistics Reform in the Behavioral Sciences*. American Psychological Association: Washington, DC.
- Knight, A., Hudson, J., McLellan, L., & Jones, M. (2014). Pre-treatment predictors of outcome in childhood anxiety disorders: a systematic review. *Psychopathology Review*, **1**, 52.
- La Greca, A. M., Silverman, W. K., & Lochman, J. E. (2009). Moving beyond efficacy and effectiveness in child and adolescent intervention research. *Journal of Consulting and Clinical Psychology*, **77**, 373–382.
- Lau, W., Chan, C. K., Li, J. C., & Au, T. K. (2010). Effectiveness of group cognitive-behavioral treatment for childhood anxiety in community clinics. *Behaviour Research and Therapy*, **48**, 1067–1077.
- Lawrence, P. J., Rooke, S. M., & Creswell, C. (2017). Prevention of anxiety among at-risk children and adolescents – a systematic review and meta-analysis. *Child and Adolescent Mental Health*, **22**, 118–130.
- Lee, P., Zehgeer, A., Ginsburg, G. S., et al. (2017). Child and adolescent adherence with cognitive behavioral therapy for anxiety: predictors and associations with outcomes. *Journal of Clinical Child and Adolescent Psychology*, April 27, 1–12.
- Legerstee, J. S., Tulen, J. H., Dierckx, B., Treffers, P. D., Verhulst, F. C., & Utens, E. M. (2010). CBT for childhood anxiety disorders: Differential changes in selective attention between treatment responders and non-responders. *Journal of Child Psychology and Psychiatry*, **51**, 162–172.
- Liber, J. M., Van Widenfelt, B. M., Utens, E. M., et al. (2008). No differences between group versus individual treatment of childhood anxiety disorders in a randomised clinical trial. *Journal of Child Psychology and Psychiatry*, **49**, 886–893.
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, **33**, 335–343.
-

- 
- Lundkvist-Houndoumadi, I., & Thastum, M. (2015). Anxious children and adolescents non-responding to CBT: Clinical predictors and families' experiences of therapy. *Clinical Psychology and Psychotherapy*, **24**, 82–93.
- Manassis, K., Avery, D., Butalia, S., & Mendlowitz, S. (2004). Cognitive-behavioral therapy with childhood anxiety disorders: Functioning in adolescence. *Depression and Anxiety*, **19**, 209–216.
- Manassis, K., Lee, T. C., Bennett, K., et al. (2014). Types of parental involvement in CBT with anxious youth: A preliminary meta-analysis. *Journal of Consulting and Clinical Psychology*, **82**, 1163–1172.
- Manassis, K., Mendlowitz, S. L., Scapillato, D., et al. (2002). Group and individual cognitive-behavioral therapy for childhood anxiety disorders: A randomized trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, **41**, 1423–1430.
- Martinsen, K. D., Aalberg, M., Gere, M., & Neumer, S.-P. (2009). Using a structured treatment, Friends for Life, in Norwegian outpatient clinics: Results from a pilot study. *The Cognitive Behaviour Therapist*, **2**, 10–19.
- McKnight, P. E., McKnight, K. M., Sidani, S., & Figueredo, A. J. (2007). *Missing Data: A Gentle Introduction*. Guilford Press: New York, NY.
- Merikangas, K. R., He, J. P., Burstein, M., et al. (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.
- Moscovitch, D. A. (2009). What is the core fear in social phobia? A new model to facilitate individualized case conceptualization and treatment. *Cognitive and Behavioral Practice*, **16**, 123–134.
- Moscovitch, D. A., Huyder, V. (2011). The Negative Self-Portrayal Scale: Development, Validation, and Application to Social Anxiety. *Behavior Therapy*, **42**, 183-196. doi: 10.1037/t03332-000
- Muthén, L.K. and Muthén, B.O. (2015). *Mplus User's Guide. Seventh Edition*. Los Angeles, CA: Muthén & Muthén.
-

- 
- Najman, J. M., Hayatbakhsh, M. R., Clavarino, A., Bor, W., O'Callaghan, M. J., & Williams, G. M. (2010). Family poverty over the early life course and recurrent adolescent and young adult anxiety and depression: A longitudinal study. *American Journal of Public Health, 100*, 1719–1723.
- Nauta, M. H., Scholing, A., Emmelkamp, P. M., & Minderaa, R. B. (2001). Cognitive-behavioural therapy for anxiety disordered children in a clinical setting: Does additional cognitive parent training enhance treatment effectiveness? *Clinical Psychology & Psychotherapy, 8*, 330–340.
- Nauta, M. H., Scholing, A., Emmelkamp, P. M., & 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*, 1270–1278.
- Nevo, A., Gili, W., Avery, D., et al. (2014). Eight years later: Outcomes of CBT-treated versus untreated anxious children. *Brain and Behavior, 4*, 765–774.
- Nevo, G. A., & Manassis, K. (2009). Outcomes for treated anxious children: A critical review of long-term-follow-up studies. *Depression and Anxiety, 26*, 650–660.
- Nilsen, T. S., Eisemann, M., & Kvernmo, S. (2013). Predictors and moderators of outcome in child and adolescent anxiety and depression: A systematic review of psychological treatment studies. *European Child and Adolescent Psychiatry, 22*, 69–87.
- Oakman, J., Van Ameringen, M., Mancini, C., & Farvolden, P. (2003). A confirmatory factor analysis of a self-report version of the Liebowitz Social Anxiety Scale. *Journal of Clinical Psychology, 59*, 149–161.
- Ollendick, T. H., Öst, L.-G., Reuterskiöld, L., et al. (2009). One-session treatment of specific phobias in youth: A randomized clinical trial in the United States and Sweden. *Journal of Consulting and Clinical Psychology, 77*, 504–516.
- Öst, L. G. (2017). Det empiriska stödet för KBT vid psykiska störningar hos barn och ungdomar. In L.-G. Öst (Ed.), *KBT inom barn- och ungdomspsykiatri*, Natur & Kultur, Stockholm.
-

- 
- Pincus, D. B., Eyberg, S. M., & Choate, M. L. (2005). Adapting parent-child interaction therapy for young children with separation anxiety disorder. *Education and Treatment of Children, 28*, 163–181.
- Piqueras, J. A., Olivares, J., & López-Pina, J. A. (2008). A new proposal for the subtypes of social phobia in a sample of Spanish adolescents. *Journal of Anxiety Disorders, 22*, 67–77.
- 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*, 345–365.
- Puleo, C. M., Conner, B. T., Benjamin, C. L., & Kendall, P. C. (2011). CBT for childhood anxiety and substance use at 7.4-year follow-up: A reassessment controlling for known predictors. *Journal of Anxiety Disorders, 25*, 690–696.
- Puleo, C. M., & Kendall, P. C. (2011). Anxiety disorders in typically developing youth: Autism spectrum symptoms as a predictor of cognitive-behavioral treatment. *Journal of Autism and Developmental Disorders, 41*, 275–286.
- Rao, P. A., Beidel, D. C., Turner, S. M., Ammerman, R. T., Crosby, L. E., & Sallee, F. R. (2007). Social anxiety disorder in childhood and adolescence: Descriptive psychopathology. *Behaviour Research and Therapy, 45*, 1181–1191.
- Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*, 741–756.
- Rapee, R. M., Lyneham, H. J., Hudson, J. L., Kangas, M., Wuthrich, V. M., & Schniering, C. A. (2013). Effect of comorbidity on treatment of anxious children and adolescents: Results from a large, combined sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 52*, 47–56.
- Rapee, R. M., & Spence, S. H. (2004). The etiology of social phobia: Empirical evidence and an initial model. *Clinical Psychology Review, 24*, 737–767.
- Reynolds, S., Wilson, C., Austin, J., & Hooper, L. (2012). Effects of psychotherapy for anxiety in children and adolescents: A meta-analytic review. *Clinical Psychology Review, 32*, 251–262.
-

- Rith-Najarian, L. R., Park, A. L., Wang, T., Etchison, A. I., Chavira, D. A., & Chorpita, B. F. (2017). Applying new evidence standards to youth cognitive behavioral therapies – A review. *Behaviour Research and Therapy*, **90**, 147–158.
- Rogers, J. L., Howard, K. I., & Vessey, J. T. (1993). Using significance tests to evaluate equivalence between two experimental groups. *Psychological Bulletin*, **113**, 553–565.
- Saavedra, L. M., Silverman, W. K., Morgan-Lopez, A. A., & Kurtines, W. M. (2010). Cognitive behavioral treatment for childhood anxiety disorders: Long-term effects on anxiety and secondary disorders in young adulthood. *Journal of Child Psychology and Psychiatry*, **51**, 924–934.
- Santucci, L. C., Thomassin, K., Petrovic, L., & Weisz, J. R. (2015). Building evidence-based interventions for the youth, providers, and contexts of real-world mental-health care. *Child Development Perspectives*, **9**, 67–73.
- Sharp, C., Goodyer, I. M., & Croudace, T. J. (2006). The Short Mood and Feelings Questionnaire (SMFQ): a unidimensional item response theory and categorical data factor analysis of self-report ratings from a community sample of 7- through 11-year-old children. *Journal of Abnormal Child Psychology*, **34**, 365–377.
- Shirk, S. R., & Karver, M. (2003). Prediction of treatment outcome from relationship variables in child and adolescent therapy: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, **71**, 452–464.
- Shortt, A. L., Barrett, P. M., & Fox, T. L. (2001). Evaluating the FRIENDS program: A cognitive-behavioral group treatment for anxious children and their parents. *Journal of Clinical Child Psychology*, **30**, 525–535.
- Silverman, W. K., & Albano, A. M. (1996). *Anxiety Disorders Interview Schedule (ADIS-IV) Parent Interview Schedules*. Albany, NY: Greywind Publications.
- Silverman, W. K., & Field, A. P. (2011). *Anxiety Disorders in Children and Adolescents*, second edition. Cambridge University Press: New York, NY.
- [Silverman, W. K., & Kurtines, W. M. (1996). *Anxiety and phobic disorders: a pragmatic approach*. New York: Kluwer Academic/Plenum Publishers.
-

- 
- Silverman, W. K., & Nelles, W. B. (1988). The Anxiety Disorders Interview Schedule for Children. *Journal of the American Academy of Child and Adolescent Psychiatry*, **27**, 772–778.
- Silverman, W. K., & Ollendick, T. H. (2005). Evidence-based assessment of anxiety and its disorders in children and adolescents. *Journal of Clinical Child and Adolescent Psychology*, **34**, 380–411.
- Silverman, W. K., Pina, A. A., & Viswesvaran, C. (2008). Evidence-based psychosocial treatments for phobic and anxiety disorders in children and adolescents. *Journal of Clinical Child and Adolescent Psychology*, **37**, 105–130.
- Silverman, W. K., Saavedra, L. M., & Pina, A. A. (2001). Test-retest reliability of anxiety symptoms and diagnoses with the anxiety disorders interview schedule for DSM-IV: Child and parent versions. *Journal of the American Academy of Child and Adolescent Psychiatry*, **40**, 937–944.
- Smith, M. M., McLeod, B. D., Southam-Gerow, M. A., Jensen-Doss, A., Kendall, P. C., & Weisz, J. R. (2017). Does the delivery of CBT for youth anxiety differ across research and practice settings? *Behavior Therapy*, **48**, 501–516.
- Southam-Gerow, M. A., Chorpita, B. F., Miller, L. M., & Gleacher, A. A. (2008). Are children with anxiety disorders privately referred to a university clinic like those referred from the public mental health system? *Administration and Policy in Mental Health and Mental Health Services Research*, **35**, 168–180.
- Southam-Gerow, M. A., Rodríguez, A., Chorpita, B. F., & Daleiden, E. L. (2012). Dissemination and implementation of evidence based treatments for youth: Challenges and recommendations. *Professional Psychology: Research and Practice*, **43**, 527–534.
- Southam-Gerow, M. A., Weisz, J. R., Chu, B. C., McLeod, B. D., Gordis, E. B., & Connor-Smith, J. K. (2010). Does cognitive behavioral therapy for youth anxiety outperform usual care in community clinics? An initial effectiveness test. *Journal of the American Academy of Child and Adolescent Psychiatry*, **49**, 1043–1052.
-

- 
- Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behaviour Research and Therapy*, **36**, 545–566. doi 10.1016/S0005-7967(98)00034-5.
- Spence, S. H., Barrett, P. M., & Turner, C. M. (2003). Psychometric properties of the Spence Children's Anxiety Scale with young adolescents. *Journal of Anxiety Disorders*, **17**, 605–625. doi: 10.1016/S0887-6185(02)00236-0.
- Spence, S. H., & Rapee, R. M. (2016). The etiology of social anxiety disorder: An evidence-based model. *Behaviour Research and Therapy*, **86**, 50–67.
- Stone, L. L., Otten, R., Engels, R. C., Vermulst, A. A., & Janssens, J. M. (2010). Psychometric properties of the parent and teacher versions of the strengths and difficulties questionnaire for 4- to 12-year-olds: A review. *Clinical Child and Family Psychology Review*, **13**, 254–274.
- Sumter, S., Bokhorst, C., & Westenberg, P. M. (2009). Social fears during adolescence: Is there an increase in distress and avoidance? *Journal of Anxiety Disorders*, **23**, 897–903.
- Van Roy, B., Veenstra, M., & Clench-Aas, J. (2008). Construct validity of the five-factor Strengths and Difficulties Questionnaire (SDQ) in pre-, early, and late adolescence. *Journal of Child Psychology and Psychiatry*, **49**, 1304–1312.
- Verduin, T. L., & Kendall, P. C. (2003). Differential occurrence of comorbidity within childhood anxiety disorders. *Journal of Clinical Child and Adolescent Psychology*, **32**, 290–295.
- Verduin, T. L., & Kendall, P. C. (2008). Peer perceptions and liking of children with anxiety disorders. *Journal of Abnormal Child Psychology*, **36**, 459–469.
- Villabø, M. A., Cummings, C. M., Gere, M. K., Torgersen, S., & Kendall, P. C. (2013). Anxious youth in research and service clinics. *Journal of Anxiety Disorders*, **27**, 16–24.
- Vostanis, P. (2006). Strengths and Difficulties Questionnaire: Research and clinical applications. *Current Opinion in Psychiatry*, **19**, 367–372.
- Vriends, N., Becker, E. S., Meyer, A., Michael, T., & Margraf, J. (2007). Subtypes of social phobia: Are they of any use? *Journal of Anxiety Disorders*, **21**, 59–75.
-

- 
- Walkup, J. T., Albano, A. M., Piacentini, J., et al. (2008). Cognitive behavioral therapy, sertraline, or a combination in childhood anxiety. *New England Journal of Medicine*, **359**, 2753–2766.
- Wang, J., & Wang, X. (2012). *Structural Equation Modeling: Applications Using Mplus*. John Wiley & Sons: Chichester.
- Warwick, H., Reardon, T., Cooper, P., et al. (2017). Complete recovery from anxiety disorders following cognitive behavior therapy in children and adolescents: A meta-analysis. *Clinical Psychology Review*, **52**, 77–91.
- Weems, C. F., & Costa, N. M. (2005). Developmental differences in the expression of childhood anxiety symptoms and fears. *Journal of the American Academy of Child & Adolescent Psychiatry*, **44**. doi: 10.1097/01.chi.0000162583.25829.4b
- Weisz, J. R., Chorpita, B. F., Palinkas, L. A., et al. (2012). Testing standard and modular designs for psychotherapy treating depression, anxiety, and conduct problems in youth: A randomized effectiveness trial. *Archives of General Psychiatry*, **69**, 274–282.
- Weisz, J. R., Krumholz, L. S., Santucci, L., Thomassin, K., & Ng, M. Y. (2015). Shrinking the gap between research and practice: Tailoring and testing youth psychotherapies in clinical care contexts. *Annual Review of Clinical Psychology*, **11**, 139–163.
- Weisz, J. R., Ng, M. Y., Rutt, C., Lau, N., & Masland, S. (2013a). Psychotherapy for children and adolescents. In M. J. Lambert (editor): *Bergin and Garfield's Handbook of Psychotherapy and Behavior Change*, sixth edition, pp. 541–586. Wiley: Hoboken, NJ.
- Weisz, J. R., Ugueto, A. M., Cheron, D. M., & Herren, J. (2013b). Evidence-based youth psychotherapy in the mental health ecosystem. *Journal of Clinical Child and Adolescent Psychology*, **42**, 274–286.
- Wergeland, G. J., Fjermestad, K. W., Marin, C. E., et al. (2014). An effectiveness study of individual vs. group cognitive behavioral therapy for anxiety disorders in youth. *Behaviour Research and Therapy*, **57**, 1–12.
-



- 
- Wergeland, G. J., Fjermestad, K. W., Marin, C. E., et al. (2016). Predictors of treatment outcome in an effectiveness trial of cognitive behavioral therapy for children with anxiety disorders. *Behaviour Research and Therapy*, **76**, 1–12.
- Westbrook, D., & Kirk, J. (2005). The clinical effectiveness of cognitive behaviour therapy: Outcome for a large sample of adults treated in routine practice. *Behaviour Research and Therapy*, **43**, 1243–1261.
- Westenberg, P. M., Drewes, M. J., Goedhart, A. W., Siebelink, B. M., & Treffers, P. D. (2004). A developmental analysis of self-reported fears in late childhood through mid-adolescence: Social-evaluative fears on the rise? *Journal of Child Psychology and Psychiatry*, **45**, 481–495.
- Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*, **84**, 768–782.
- Westra, H. A., & Dozois, D. J. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research*, **30**, 481–498.
- Wolk, C. B., Carper, M. M., Kendall, P. C., Olino, T. M., Marcus, S. C., & Beidas, R. S. (2016). Pathways to anxiety–depression comorbidity: A longitudinal examination of childhood anxiety disorders. *Depression and Anxiety*, **33**, 978–986.
- Wolk, C. B., Kendall, P. C., & Beidas, R. S. (2015). Cognitive-behavioral therapy for child anxiety confers long-term protection from suicidality. *Journal of the American Academy of Child and Adolescent Psychiatry*, **54**, 175–179.
- Wood, J. J., Drahota, A., Sze, K., Har, K., Chiu, A., & Langer, D. A. (2009). Cognitive behavioral therapy for anxiety in children with autism spectrum disorders: A randomized, controlled trial. *Journal of Child Psychology and Psychiatry*, **50**, 224–234.
- Wood, J. J., Piacentini, J. C., Bergman, R. L., McCracken, J., & Barrios, V. (2002). Concurrent validity of the Anxiety Disorders Section of the Anxiety Disorders
-

---

Interview Schedule for DSM-IV: Child and parent versions. *Journal of Clinical Child and Adolescent Psychology*, **31**, 335–342.

World Health Organization. (1992). *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines* (Volume 1). World Health Organization: Geneva.

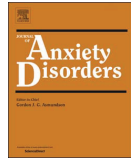
Wothke, W. (2000). Longitudinal and multigroup modeling with missing data. In T. D. Little, K. U. Schnabel, & J. Baumert (editors): *Modeling Longitudinal and Multilevel Data: Practical Issues, Applied Approaches, and Specific Examples*, pp. 219–240, 269–281. Lawrence Erlbaum Associates: Mahwah, NJ.

Yang, C.-C. (2006). Evaluating latent class analysis models in qualitative phenotype identification. *Computational Statistics and Data Analysis*, **50**, 1090–1104.









## Long-term effectiveness of cognitive behavioral therapy for youth with anxiety disorders<sup>☆</sup>

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### ABSTRACT

Cognitive behavioral therapy (CBT) has demonstrated favorable long-term outcomes in youth with anxiety disorders in efficacy trials. However, long-term outcomes of CBT delivered in a community setting are uncertain. This study examined the long-term outcomes of individual (ICBT) and group CBT (GCBT) in youth with anxiety disorders treated in community mental health clinics. A total of 139 youth (mean age at assessment 15.5 years, range 11–21 years) with a principal diagnosis of separation anxiety disorder (SAD), social anxiety disorder (SOP), and/or generalized anxiety disorder (GAD) were evaluated, on average, 3.9 years post-treatment (range 2.2–5.9 years). Outcomes included loss of all inclusion anxiety diagnoses, loss of the principal anxiety diagnosis and changes in youth- and parent-rated youth anxiety symptoms. At long-term follow-up, there was loss of all inclusion anxiety diagnoses in 53%, loss of the principal anxiety diagnosis in 63% of participants as well as significant reductions in all anxiety symptom measures. No statistical significant differences in outcome were obtained between ICBT and GCBT. Participants with a principal diagnosis of SOP had lower odds for recovery, compared to those with a principal diagnosis of SAD or GAD. In conclusion, outcomes of CBT for youth anxiety disorders delivered in community mental health clinics were improved at nearly 4 years post-treatment, and recovery rates at long-term follow-up were similar to efficacy trials.

### 1. Introduction

Cognitive behavioral therapy (CBT) is a well-established treatment for anxiety disorders in children and adolescents (hereafter youth) (Higa-McMillan, Francis, Rith-Najarian, & Chorpita, 2016). Meta-analyses have shown that approximately 60% of youth recover from their anxiety disorders and experience significant symptom reduction following treatment (James, James, Cowdrey, Soler, & Choke, 2013; Warwick et al., 2017). However, there has been less focus on the question of whether treatment outcomes are maintained in the long term. Relapse can lead to detrimental consequences at individual,

family, and societal levels, as early anxiety disorders predict later emotional, social, academic, and vocational problems (Copeland, Angold, Shanahan, & Costello, 2014; Kendall & Ollendick, 2004). Successful CBT treatment for youth anxiety disorders on the other hand, provides protection from later sequelae (Puleo, Conner, Benjamin, & Kendall, 2011; Wolk, Kendall, & Beidas, 2015). Furthermore, investigating long-term outcomes is essential in establishing treatment efficacy in youth anxiety disorders (Chambless & Hollon, 1998).

Long-term follow-up is commonly defined as follow-up at least two years post-treatment (Gibby, Casline, & Ginsburg, 2017; Nevo & Manassis, 2009). To date, five studies based on separate samples have

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examined the long-term effects of CBT protocols in youth with mixed anxiety disorders in the form of separation anxiety disorder (SAD), social anxiety disorder (SOP), and/or generalized anxiety disorder (GAD) (Barrett, Duffy, Dadds, & Rapee, 2001; Benjamin, Harrison, Settiani, Brodman, & Kendall, 2013; Ginsburg et al., 2014; Kendall & Southam-Gerow, 1996; Kendall, Safford, Flannery-Schroeder, & Webb, 2004), over follow-up periods ranging from 2 to 19 years post-treatment ( $M = 7.9$  years;  $Mdn = 6.2$  years). These studies indicate that post-treatment outcomes were either maintained or improved at long-term follow-up, with 46.5–85.7% of study participants no longer fulfilling the diagnostic criteria for anxiety disorders (e.g. Barrett et al., 2001; Ginsburg et al., 2014). A recent review of long-term follow-up studies of youth treated for any anxiety disorder (with the exception of obsessive-compulsive disorder and post-traumatic stress disorder), with follow-up assessments a mean of 5.9 years post-treatment, found that 64.6% of youth were in remission. More specifically, 57.0% and 76.7% had lost all inclusion anxiety diagnoses and their primary anxiety diagnosis, respectively (Gibby et al., 2017). In addition, different treatment formats in the form of individual CBT (ICBT) and group CBT (GCBT) in youth with anxiety disorder were examined by Saavedra et al.; the authors found no difference in long-term outcomes between ICBT and GCBT at a mean of 9.8 years post-treatment (Saavedra, Silverman, Morgan-Lopez, & Kurtines, 2010), consistent with previous meta-analyses of studies of short-term outcomes which showed similar effect sizes for both ICBT and GCBT (In-Albon & Schneider, 2006; Silverman, Pina, & Viswesvaran, 2008).

Long-term outcome studies differ considerably in reported outcome measures, e.g., absence of the principal inclusion anxiety diagnosis (Kendall et al., 2004), absence of all inclusion anxiety diagnoses (Barrett et al., 2001), or absence of all anxiety diagnoses (Benjamin et al., 2013). However, loss of one anxiety diagnosis does not necessarily indicate the absence of further anxiety-related impairments. Furthermore, heterogeneity in reported outcomes makes comparisons across long-term follow-up studies difficult and hence challenges the generalizability of the study findings. Consequently, this calls for more detailed information on diagnostic outcomes following treatment, including loss of the principal anxiety diagnosis, all comorbid anxiety diagnoses, as well as symptom measure outcomes (Gibby et al., 2017; Warwick et al., 2017).

All of the above-cited studies are *efficacy* trials conducted at specialized university clinics. Efficacy trials allow for high levels of methodological rigor and control, thus achieving high internal validity. However, to what extent findings from such studies are transferable to community clinical settings is unclear (Hunsley & Lee, 2007; Santucci, Thomassin, Petrovic, & Weisz, 2015). Factors that may influence treatment outcomes differentially in community clinics, compared to university clinics, include differing patient populations (e.g., different inclusion and exclusion criteria, greater population heterogeneity in the community setting), therapist-related factors (e.g., training, caseloads, access to expert supervision), treatment context (e.g., availability of research resources, treatment monitoring) and treatment content (e.g. potential less use of exposure exercises) (Smith et al., 2017). It is argued that these factors contribute to reduced effect sizes of treatment when efficacy-supported therapies are transferred to community clinics (Weisz et al., 2013).

To our knowledge, no study to date has examined the long-term outcomes of CBT for anxiety disorders in community mental health clinics, i.e., the *effectiveness* of long-term treatment. Several short-term effectiveness studies with follow-up assessments 3–15 months post-treatment ( $M = 9.8$  months,  $Mdn = 9$  months) reported recovery rates ranging from 52% to 78% (Barrington, Prior, Richardson, & Allen, 2005; Bodden et al., 2008; Chorpita et al., 2013; Lau, Chan, Li, & Au, 2010; Nauta, Scholing, Emmelkamp, & Minderaa, 2001; Nauta, Scholing, Emmelkamp, & Minderaa, 2003). Overall, the studies confirmed the maintenance of treatment gains from post-treatment to follow-up, albeit with slightly lower recovery rates compared to those

obtained from efficacy trials. However, there is a need to examine effectiveness of CBT for mixed anxiety disorders in youth beyond 15 months post-treatment.

It has been argued that the three main anxiety disorders SAD, SOP, and GAD are manifestations of the same underlying anxiety construct and therefore are amenable to treatment with the same CBT protocols (Crawley, Beidas, Benjamin, Martin, & Kendall, 2008; Silverman & Kurtines, 1996). However, recent short-term studies showed that children with SOP had poorer treatment outcomes from generic CBT protocols, compared to those with GAD and/or SAD (Hudson et al., 2015; Reynolds, Wilson, Austin, & Hooper, 2012). Based on an efficacy trial, Kerns, Read, Klugman, and Kendall (2013) reported comparable outcomes for SOP, SAD, and GAD immediately following CBT but found youth with SOP were significantly less improved at 7.4-year follow-up. On the other hand, Barrett et al. (2001) found no evidence that pre-treatment diagnosis, including SOP, differentially affected long-term treatment outcomes. Thus, further studies on the long-term effects of CBT in youth with SOP are warranted.

The primary aim of the present study was to investigate the long-term outcomes of CBT in youth with anxiety disorders treated in community mental health clinics. Based on previous long-term efficacy studies and on short-term effectiveness studies, we expected that outcomes of CBT would be maintained or improved in the community setting, yet below comparative efficacy studies. The secondary aim was to investigate the effects of using different treatment formats (i.e., GCBT versus ICBT) on long-term outcomes. Based on existing evidence, we expected the effects of both treatment formats to be maintained during the follow-up period and to be equivalent at long-term follow-up. The third aim was to assess for disorder-specific differences in treatment outcomes, for which we predicted that outcomes in youth with a principal diagnosis of SOP would be inferior, compared to those with a principal diagnosis of GAD and/or SAD.

## 2. Method

### 2.1. Participants

Eligible participants were selected from a total of 179 youth who participated in a randomized controlled trial (RCT) investigating the effectiveness of ICBT and GCBT, compared to a waitlist control, in youth with mixed anxiety disorders treated in community mental health clinics (Wergeland et al., 2014). The study was conducted from 2008 to 2012. Age of participants ranged from 8 to 15 years at the time of recruitment. The inclusion criterion was a principal diagnosis of SAD, SOP, and/or GAD. The only exclusion criterion included pervasive developmental disorder, psychotic disorder, severe conduct disorder, and/or mental retardation. Participants were assessed pre- and post-treatment, and at 1-year follow-up. A detailed description of the original sample, method, and outcomes has been published elsewhere (Wergeland et al., 2014).

A total of 139 youth participated in the present study. Youth were assessed an average of 3.9 years post-treatment ( $SD = 0.8$ , range 2–6 years). Age of participants at long-term follow-up ranged from 11 to 21 years ( $M = 15.5$ ,  $SD = 2.5$ ), and 54.7% were female. Youth participating in this long-term follow-up study ( $N = 139$ ) were compared to those from the original RCT not participating in the present study ( $n = 40$ ) in terms of pre-treatment socio-demographic characteristics (i.e., age, gender, ethnicity, parent occupational status) and pre-treatment clinical variables (i.e., clinical severity rating (CSR) of the principal anxiety diagnosis, anxiety and depressive symptoms, comorbidity, principal anxiety diagnosis present at post-treatment). There were no significant differences on any of these variables between youth participating and those not participating in the long-term follow-up study (see Table 1). Furthermore, no differences were found in post-treatment outcomes (loss of the principal diagnosis and loss of all inclusion anxiety diagnoses, changes in symptom measures) between youth in the

**Table 1**  
Comparison of pre- and post-treatment characteristics of participants and non-participants at long-term follow-up.

	Participants (n = 139)				Non-participants (n = 40)				p
	M	(SD)	n	%	M	(SD)	n	%	
<b>Pre-treatment characteristics</b>									
Gender									0.72
Female			76	54.7			20	50.0	
Age, mean (SD)	11.46	2.11			11.85	2.03			0.16
Age group (years)									0.45
8–12			94	67.6			24	60.0	
12–15			45	32.4			16	40.0	
Family social class <sup>a</sup>									0.93
High			68	48.9			15	37.5	
Middle			44	31.7			11	27.5	
Low			15	10.8			2	5.0	
Not reported			12	8.6			12	30.0	
Principal diagnosis									0.10
SAD			49	35.3			9	22.5	
SOP			64	46.0			20	50.0	
GAD			26	18.7			11	27.5	
Principal diagnosis CSR	7.01	1.10			6.92	1.19			0.60
Number of inclusion anxiety diagnoses	2.04	0.79			1.80	0.72			0.08
SCAS-C	36.77	16.87			34.61	15.58			0.50
SCAS-P	35.28	12.72			33.42	13.94			0.43
SMFQ-C	7.43	5.40			7.61	6.10			0.86
SMFQ-P	7.50	5.06			7.83	4.91			0.72
Other comorbidity									0.27
Other anxiety disorder			20	14.4			7	17.5	
Depression <sup>b</sup>			16	11.5			5	12.5	
Externalizing disorders <sup>d</sup>			15	10.8			1	2.5	
Tic disorder <sup>d</sup>			11	7.9			1	2.5	
Anorexia <sup>d</sup>			0	0.0			2	5.0 <sup>c</sup>	
<b>Post-treatment characteristics</b>									
Principal diagnosis CSR	4.72	2.37	(n = 139)		4.53	2.83	(n = 15 <sup>b</sup> )		0.77
Comorbid inclusion anxiety diagnoses	0.52	0.73			0.20	0.41			0.02 <sup>c</sup>
Loss of principal diagnosis <sup>d</sup>			56	40.3			7	46.7	0.63
Loss of all inclusion anxiety diagnoses <sup>d</sup>			37	26.6			4	26.7	1.00
SCAS-C	24.15	16.00			23.42	12.70			0.34
SCAS-P	27.58	13.64			23.83	11.52			0.34
SMFQ-C	5.66	5.93			3.17	4.15			0.08
SMFQ-P	5.49	4.91			5.17	6.56			0.82

Note. Externalizing disorders = Attention deficit hyperactive disorder and/or Oppositional defiant disorder; GAD = Generalized Anxiety Disorder; GCBT = Group Cognitive Behavioral Therapy; ICBT = Individual Cognitive Behavioral Therapy; Other anxiety disorder = OCD, Panic Disorder, PTSD, Specific anxiety disorder; SAD = Separation Anxiety Disorder; SCAS = Spence Child Anxiety Scale, C = Child, P = Parent; SMFQ = Short Mood and Feelings Questionnaire, C = Child, P = Parent; SOP = Social Anxiety Disorder.

<sup>a</sup> Family social class was defined by the highest-ranking parent. Parents were classified into rank-ordered social classes in accordance with the Registrar General Social Class coding scheme (Currie et al., 2008).

<sup>b</sup> Fifteen of the 40 participants not attending the long-term follow-up were assessed at post-treatment.

<sup>c</sup> Not significant after the modified Bonferroni procedure was applied.

<sup>d</sup> Due to small sample sizes, Fisher's exact test was used for these comparisons.

present long-term study and those who attended post-treatment assessment but did not participate in the present long-term follow-up (n = 15).

## 2.2. Treatment, setting, and therapists

The treatment manual used in the RCT was *FRIENDS for life*, 4th edition (Barrett, 2005). This program stems from the Australian Coping Koala program (Barrett, Dadds, & Rapee, 1991) that was adapted from Kendall's original Coping Cat manual (Kendall, 1990). Children aged 8–12 received the child version of the protocol, whereas youth aged 12–15 received the adolescent version. Youth aged 12 were treated using either the child (n = 34) or the adolescent version (n = 5), based on the clinician's assessment of the youth's level of maturity. The ICBT protocol comprised ten 60-min sessions, and the GCBT protocol comprised ten 90-min sessions. Two booster sessions were conducted, one and three months after the tenth session. Parents attended two of the ten sessions, the last 15 min of the remaining eight sessions, as well as two separate parent-only sessions.

The RCT was conducted at seven public child and adolescent mental

health outpatient clinics. Seventeen therapists participated, of whom five had completed a formal 2-year post-graduation CBT training and the remaining 12 had little or no previous training in CBT. All therapists received training in the *FRIENDS for life* protocol, as well as supervision throughout the treatment sessions by licensed *FRIENDS* therapists. All treatment sessions were delivered as part of the therapist's routine caseload, and all therapists administered both ICBT and GCBT, with two therapists participating in each GCBT session. Assessment was conducted by 16 assessors, all clinicians employed at the clinics. Assessors received specific training in the Anxiety Disorders Interview Schedule child and parent version (ADIS-C/P) in a 2-day workshop, and received supervision during the study period. Therapists' treatment adherence and competence were assessed on a 7-point scale ranging from 0 (none/poor skills) to 6 (thorough/excellent skills). Therapists' mean scores for adherence to both treatment formats ranged from 3.97 to 5.42 (M = 4.60, SD = 0.88), and for competence 3.25–5.22 (M = 4.12, SD = 0.97), using the Competence and Adherence Scale for Cognitive Behavioral Therapy (CAS-CBT; Bjaastad et al., 2016). A predetermined score of 3.0 was set as the minimum threshold for adequate therapist adherence and competence. Further details on the protocol are as



previously described (Wergeland et al., 2014).

### 2.3. Measures

#### 2.3.1. The Anxiety Disorders Interview Schedule child and parent version (ADIS-C/P)

The ADIS-C/P (Silverman & Albano, 1996) was used to assess inclusion diagnoses. The same modules assessing SAD, SOP and GAD which were used in the original RCT (pre-treatment, post-treatment, and 1-year follow-up) were also used in the long-term follow-up study, to provide comparable results across assessment points. The modules assessing DSM-IV criteria for the diagnoses of SAD, SOP, and GAD were used in youth aged 17 or younger ( $n = 107$ ). Youth and parents were interviewed independently, with parents receiving the parent version of the Interview Schedule (ADIS-P) ( $n = 107$ ). The CSR scale ranges from 0 to 8, with a minimum CSR score of 4 required for a clinical diagnosis to be assigned (Silverman & Albano, 1996). Diagnosis and CSR were assigned based on the youth and parent composite score. In cases of multiple anxiety diagnoses, the one causing the highest interference as measured by the CSR is considered to be the principal diagnosis. This interview was previously shown to have high interrater reliability (Silverman & Nelles, 1988) and retest reliability (Silverman, Saavedra, & Pina, 2001). For the purpose of the long-term follow-up study, the ADIS interview was slightly modified to also assess whether youth received additional treatment since completion of the treatment protocol.

#### 2.3.2. The Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV-L)

The ADIS-IV-L (Brown, Barlow, & DiNardo, 1994) was used to assess DSM-IV criteria for SAD, SOP, and GAD in youth aged 18 or older ( $n = 32$ ). Similar to the ADIS-C/P, the CSR scale ranges from 0 to 8, with a minimum CSR score of 4 required for a clinical diagnosis to be given. This interview method has previously demonstrated good to excellent reliability (Brown et al., 1994; Brown, Di Nardo, Lehman, & Campbell, 2001).

Diagnostic interviews at long-term follow-up were conducted face-to-face and video-recorded. Interviews conducted by phone (10.1%) were not recorded (see Section 2.4). A random selection of 20% of the video-recorded interviews was re-evaluated by expert raters blind to the assessors' ratings. The interrater agreement was  $k = 0.94$  on the ADIS-C and/or ADIS-P and the ADIS-IV-L. For the principal anxiety diagnosis,  $k$  values were: SAD = 1.00; SOP = 0.88; and GAD = 0.81. Regarding CSR scores for the anxiety diagnoses, intraclass correlations (ICCs) for the total sample was 0.97, whereas ICCs for the principal anxiety diagnosis were: SAD = 1.00; SOP = 0.94; and GAD = 0.93.

#### 2.3.3. The Spence Child Anxiety Scale child and parent version (SCAS-C/P)

The SCAS-C/P (Spence, 1998) was used to assess youth anxiety symptoms. The SCAS comprises 38 items rated on a 4-point scale (0 = never; 1 = sometimes; 2 = often; 3 = always), with a maximum sum score of 114. Validity, internal consistency, and adequate test-retest reliability were previously demonstrated (Spence, 1998; Spence, Barrett, & Turner, 2003). Internal consistency for SCAS in the current sample was good to excellent (parent  $\alpha = 0.92$ , child  $\alpha = 0.89$ ).

#### 2.3.4. The Short Moods and Feelings Questionnaire child and parent version (SMFQ-C/P)

The SMFQ-C/P (Angold, Costello, Messer, & Pickles, 1995) was used to assess youth depressive symptoms. The SMFQ consists of 13 items rated on a 3-point scale (0 = not true; 1 = sometimes true; 2 = true), with higher scores indicating greater severity of symptoms. In a general population sample, a cutoff score of  $\geq 8$  was found to represent the best balance between sensitivity and specificity, compared to a diagnosis of depression (Angold et al., 1995). The SMFQ was previously shown to have excellent internal consistency and good test-retest reliability in children over a 2-week period (Costello & Angold, 1988). The SMFQ

differentiates well between psychiatric and nonpsychiatric subjects in a general population (Sharp, Goodyer, & Croudace, 2006). Internal consistency in the current sample was excellent (parent  $\alpha = 0.92$ , child  $\alpha = 0.93$ ).

### 2.4. Procedure

At the time of inclusion in the original RCT, all 179 participants had consented to be contacted for long-term follow-up. At post-treatment, 154 youth completed the intervention and post-treatment assessment. Of these, 145 completed the 1-year follow-up assessment. At long-term follow-up, all 179 initial participants were contacted by telephone or mail. Among the treatment completers ( $n = 154$ ), 15 did not wish to participate in the long-term follow-up. Thus, the present study sample comprised 139 youth, i.e., 77.7% of the total initial sample and 90.3% of treatment completers (See Fig. 1). Youth and families who agreed to participate were scheduled for separate youth and parent assessments. Most interviews were conducted face-to-face in the community outpatient clinics. Fourteen interviews were conducted by phone, due to participants having moved out of the region. Three certified ADIS-C/P interviewers (two psychologists and one child psychiatrist) conducted the interviews. The ADIS-C/P interview and questionnaires were completed in the same session, whereas those who were interviewed by phone received and returned the questionnaires by mail. Interviewers were blind to the youth's inclusion anxiety diagnoses, treatment format (ICBT or GCBT), and treatment outcome both at post-treatment and at 1-year follow-up. Participating youth and parents were each compensated with a gift card (worth US\$60). The study was approved by, and conducted in accordance with the guidelines of Regional Committee for Medical and Health Research Ethics of Western Norway.

### 2.5. Data analysis

Analyses were based on the sample of 139 youth. There were no missing data regarding the diagnostic interviews. Missing data on items from the symptom measures SMFQ-C/P and SCAS-C/P ranged from 3.6% to 13.7%. Little's missing completely at random test indicated that missing data on symptom measures occurred completely at random. Missing data on all continuous variables were accounted for by full information maximum likelihood (FIML) in Mplus (Wothke, 2000), such that a missing data point did not result in list-wise deletion.

Descriptive statistics and analyses of group differences between participants and non-participants were performed using SPSS 23. All other analyses were run using Mplus 7.4 (Muthén & Muthén, 2017). To account for nonnormality present in the data, all structural equation modelling (SEM) analyses were run using a Maximum Likelihood estimator with Robust standard errors (MLR), which is robust to violations of nonnormality (Muthén & Muthén, 2017). Seven clinics participated in the study. The mean number of participants at each of the seven clinics was 20 (range 10–25). The GCBT format consisted of 16 separate treatment groups, whereas youth treated with ICBT were grouped as one cluster at each clinic (hence seven clusters), resulting in a total of 23 clusters. The design was therefore partially clustered, and models were adjusted to counter potential clustering effects (Baldwin, Bauer, Stice, & Rohde, 2011). The Holm-Bonferroni method was applied to control for experiment-related error rate at 0.05, when conducting multiple tests. Analyses were controlled for age, gender, and pre-treatment CSR score for the principal anxiety diagnosis.

At long-term follow-up, 27.3% of participants ( $n = 38$ ) reported having received additional treatment for anxiety following study treatment completion. To examine whether additional treatment influenced study outcomes, all outcome analyses were performed with and without these participants. Since inclusion of participants receiving additional treatment was not found to alter the results, they were therefore included in all subsequent analyses (data not shown; available on request). Additional regression analyses of diagnostic treatment

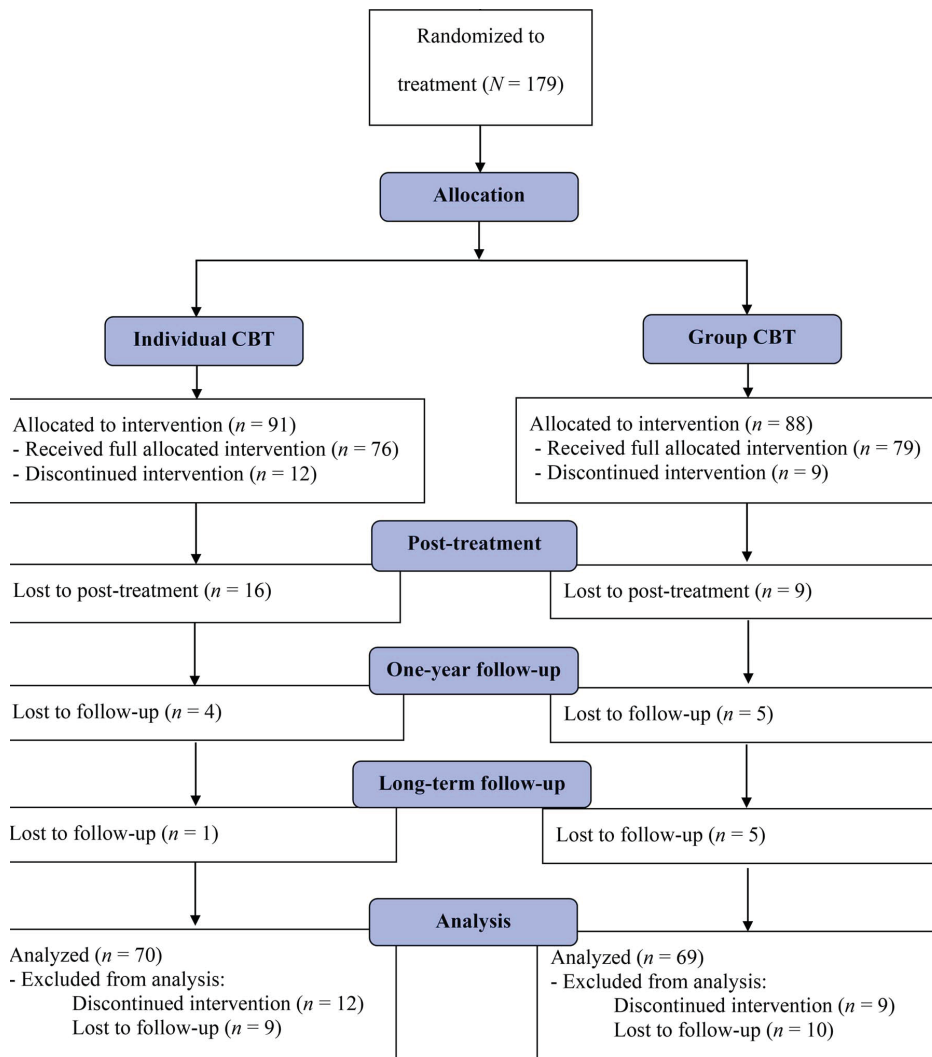


Fig. 1. Participant flowchart.

response during follow-up and the use of additional treatment were performed.

Primary outcomes were loss of all inclusion anxiety diagnoses (SAD, SOP, and GAD), and loss of the principal diagnosis. Thus, complete recovery was defined as loss of all inclusion anxiety diagnoses and recovery was defined as loss of principal inclusion anxiety diagnosis. Secondary outcomes were change in youth- and parent-reported anxiety, change in depressive symptoms and change in CSR of the primary, secondary and tertiary diagnoses. Growth rates and intercepts on CSR scores and symptom measures varied considerably between pre- and post-treatment. As a consequence, these were analyzed using piecewise latent growth curve modeling (p-LGM; Wang & Wang, 2012). To account for individually varying times of observation, random slopes for participants were estimated (Muthén & Muthén, 2017).

Secondary analyses included comparisons of the outcomes of ICBT

versus GCBT and were estimated using logistic regression analyses for diagnostic outcomes, and p-LGM for symptom change. Given that a statistically non-significant result between the two treatment formats does not imply equivalence, we conducted analyses of equivalence between GCBT and ICBT. The analyses were conducted on the CSR of the principal anxiety diagnosis and youth- and parent-reported anxiety and depressive symptoms using the confidence interval (CI) method (Rogers, Howard, & Vessey, 1993). An equivalence interval of 15% around a difference of zero was defined, with GCBT outcomes as the reference group. Differences small enough to fall within this equivalence interval were considered to be of little clinical and/or practical importance.

To examine the impact of the principal anxiety diagnosis on outcomes, we used logistic regression analysis to estimate the odds ratio (OR) for loss of the principal diagnosis for each individual principal diagnoses. We then estimated the OR for loss of the principal diagnosis

**Table 2**  
Loss of inclusion diagnoses following ICBT or GCBT and comparison between treatment formats.

ADIS-C/P combined diagnosis	Long-term follow-up							Post-treatment			
	Total sample (N = 139)		ICBT (n = 70)		GCBT (n = 69)		$\chi^2$	ICBT (n = 70)		GCBT (n = 69)	
	n	%	n	%	n	%		n	%	n	%
Loss of all inclusion anxiety diagnoses	73	53.0	39	55.7	34	49.3	0.59	22	31.4	15	23.3
Loss of principal anxiety diagnosis	87	63.0	46	65.7	41	59.4	0.59	30	42.9	26	37.7

Note. GCBT = Group Cognitive Behavioral Therapy; ICBT = Individual Cognitive Behavioral Therapy.

and growth rates of the symptom measures using latent growth curve modelling for youth with a principal diagnosis of SOP or SAD, compared to those with a principal diagnosis of GAD.

### 3. Results

#### 3.1. Primary research aim: diagnostic status at long-term follow-up

Of the 139 youth, 53% ( $n = 73$ ) did not meet the criteria for any of their inclusion anxiety diagnosis at long-term follow-up, and 63% ( $n = 87$ ) did not meet the criteria for their principal anxiety diagnosis. At post-treatment, for the same sample, the proportion of these participants was 27% ( $n = 37$ ) and 40% ( $n = 56$ ), respectively (see Table 2). Loss of principal and loss of all inclusion diagnoses differed between post-treatment and long-term follow-up, demonstrating a significant improvement ( $p < 0.05$ ).

##### 3.1.1. Diagnostic change during follow-up

In total 19% ( $n = 27$ ) of the 139 youth had lost all inclusion anxiety diagnoses at post- and long-term follow-up, whereas 40% ( $n = 56$ ) retained one or more inclusion anxiety diagnoses at post- or long-term follow-up. Of the 102 youth that had not lost all inclusion anxiety diagnoses at post-treatment, 45% ( $n = 46$ ) had recovered completely at long-term follow-up. Regression analysis revealed no significant association between these 46 youth and the use of additional interim treatment ( $OR = 0.68$ , 95% CI [0.35, 1.32],  $p = 0.34$ ). In total 31% ( $n = 43$ ) of the 139 youth had lost their principal anxiety diagnosis at both post- and long-term assessment, whereas 28% ( $n = 39$ ) retained their principal anxiety diagnosis at both assessment points. Among the 83 youth that did not lose their principal anxiety diagnosis at post-treatment, 53% ( $n = 44$ ) recovered at long-term follow-up. Regression analysis revealed no significant association between these 44 youth and the use of additional interim treatment ( $OR = 0.87$ , 95% CI [0.48, 1.56],  $p = 0.69$ ).

##### 3.1.2. Clinical severity rating and symptom measures

Table 3 displays the severity ratings of the principal, secondary, and tertiary anxiety diagnoses and symptom measures at pre- and post-treatment and long-term follow-up. There was a significant reduction in CSR for the principal, secondary, and tertiary anxiety diagnoses ( $p < 0.05$ ), as well as a significant reduction in symptom scores for all symptom measures from post-treatment to long-term follow-up ( $p < 0.05$ ). Only youth self-reported depressive symptoms remained unchanged at long-term follow-up ( $p = 0.54$ ). As found for post-treatment, analyses revealed no significant differences between the ICBT and GCBT conditions at long-term follow-up. No significant interaction effect between time and treatment format was found. Thus, the rate of symptom reduction during long-term follow-up was statistically similar for both treatment formats (i.e., ICBT and GCBT), and the improvement range for both treatment formats was also similar across time.

##### 3.1.3. Relationship between treatment response at post-treatment and long-term follow-up

We examined the relationship between outcomes for the

participants' principal anxiety diagnosis based on CSR scores at post-treatment and long-term follow-up, as detailed in Table 4. Based on criteria for clinically significant change by Jacobsen and Truax (1991), the participants' clinical status at post-treatment and at long-term follow-up, using their CSR scores in comparison with their pre-treatment CSR scores, was classified into four categories: *deterioration*: CSR score increased by  $\geq 2$  points; *no change*: CSR score changed by  $\pm 1$  point; *response*: CSR score decreased by  $\geq 2$  points; and *recovery*: CSR score decreased by  $\geq 2$  points and the score was  $\leq 3$ . Of the 56 participants who were classified as recovered at post-treatment, 43 (77% of recovered participants, or 31% of the entire sample,  $n = 139$ ) were still classified as recovered at long-term follow-up, whereas the remaining 13 (23%) had worsened to some degree and re-qualified for their principal diagnosis. Of the 26 participants classified as treatment responders at post-treatment, 17 (65%) had recovered at long-term follow-up, five maintained their treatment response status, whereas four had worsened and demonstrated no change from pre-treatment. Of the 53 participants classified as non-responders at post-treatment, 26 (49%) had recovered at long-term follow-up, eight (15%) were responders, 18 (34%) remained unchanged from pre-treatment, and one participant had worsened. Finally, of the four participants classified as deteriorated at post-treatment, one had fully recovered at long-term follow-up, whereas two demonstrated only marginal change and thus were classified as no change, and one remained classified as deteriorated. Summing up the number of participants who demonstrated maintenance, improvement, or worsening of their outcome status from post-treatment to long-term follow-up, 67 participants (48%) maintained their classification, whereas 54 demonstrated further improvement (39%), with 44 who fully recovered, and 18 participants (13%) worsened by re-qualifying for their principal diagnosis. Regression analysis of the presented changes in CSR scores, demonstrated a statistical significant relationship between treatment response at post-treatment and response at long-term follow-up ( $z = 3.0$ ,  $p < 0.01$ ), indicating further improvement during the follow-up period. Among youth recovering during follow-up ( $n = 44$ ), chi-square analyses revealed no significant association with the use of interim mental health treatment and recovery ( $p = 0.22$ ).

#### 3.2. Secondary research aims

##### 3.2.1. Individual versus group treatment

At long-term follow-up, logistic regression analyses demonstrated no statistical significant differences in loss of all inclusion anxiety diagnosis and loss of principal inclusion anxiety diagnoses between ICBT and GCBT, with GCBT as the reference (49% versus 56%,  $OR = 1.26$ , 95% CI [0.80, 2.01],  $p = 0.41$ ), or loss of principal inclusion anxiety diagnoses (59% versus 66%,  $OR = 1.29$ , 95% CI [0.85, 1.84],  $p = 0.50$ ). p-LGM analyses showed no statistical significant differences between ICBT and GCBT in youth-rated anxiety symptoms ( $z = 0.86$ ,  $p = 0.39$ ), parent-rated youth anxiety symptoms ( $z = 0.49$ ,  $p = 0.63$ ), youth-rated depressive symptoms ( $z = 0.10$ ,  $p = 0.92$ ), or parent-rated youth depressive symptoms ( $z = -1.28$ ,  $p = 0.20$ ).

Equivalency between ICBT and GCBT at long-term follow-up was established for the CSR outcome score of the participant's principal

**Table 3**  
Severity ratings and symptom measures at post-treatment and long-term follow-up. Main effects of group and time and group by time interaction.

Measure	All patients		ICBT (n = 70)		GCBT (n = 69)			Pre-post		Post-LTFU	
	Mean	(SD)	Mean	(SD)	Mean	(SD)		β	z	β	z
<b>CSR, principal anxiety diagnosis</b>											
Pre-treatment (n = 139)	6.90	(1.14)	6.93	(1.09)	6.87	(1.19)	G	0.05	0.19	-0.12	-0.33
Post-treatment	4.72	(2.37)	4.74	(2.47)	4.71	(2.28)	T	-0.31	-10.57***	-0.05	-8.85***
LTFU	2.29	(3.10)	2.16	(3.11)	2.43	(3.11)	I	0.02	0.31	0.00	-0.31
<b>CSR, secondary anxiety diagnosis</b>											
Pre-treatment (n = 99)	6.31	(1.07)	6.23	(1.01)	6.39	(1.12)	G	0.05	0.18	-0.22	-0.61
Post-treatment	4.01	(2.47)	4.15	(2.55)	3.88	(2.41)	T	-0.13	-3.64***	-0.05	-6.24***
LTFU	1.27	(2.63)	0.92	(2.14)	1.61	(2.99)	I	0.06	0.90	-0.01	-0.81
<b>CSR, tertiary anxiety diagnosis</b>											
Pre-treatment (n = 45)	5.56	(1.22)	5.36	(1.09)	5.74	(1.32)	G	-0.10	-0.23	0.10	0.16
Post-treatment	3.96	(2.41)	4.05	(2.30)	3.87	(2.56)	T	-0.13	-3.64***	-0.05	-6.24***
LTFU	1.44	(2.81)	1.45	(2.84)	1.43	(2.84)	I	0.01	0.34	0.00	-0.31
<b>SCAS-C</b>											
Pre-treatment (n = 131)	36.77	(16.87)	36.19	(15.97)	37.73	(17.87)	G	-1.34	-0.54	0.35	0.16
Post-treatment	27.65	(15.52)	27.23	(16.39)	28.07	(14.72)	T	-1.43	-6.58***	0.09	-2.43
LTFU	24.15	(16.00)	24.9	(14.13)	23.39	(17.78)	I	0.06	0.15	0.06	0.85
<b>SCAS-P</b>											
Pre-treatment (n = 133)	35.28	(12.28)	34.78	(13.35)	35.83	(11.08)	G	0.23	0.12	1.45	0.70
Post-treatment	27.58	(13.64)	28.15	(15.06)	27.02	(12.17)	T	-1.24	-7.24***	-0.15	-6.37***
LTFU	21.63	(13.26)	22.32	(16.69)	20.93	(13.90)	I	0.06	0.15	0.06	0.85
<b>SMFQ-C</b>											
Pre-treatment (n = 128)	7.43	(5.40)	7.33	(5.19)	7.54	(5.65)	G	-0.23	-0.30	-0.03	-0.03
Post-treatment	5.97	(5.34)	5.90	(5.10)	6.04	(5.60)	T	-0.22	-2.95**	-0.01	-0.62
LTFU	5.66	(5.93)	5.76	(5.67)	5.57	(6.22)	I	-0.03	-0.16	0.00	0.13
<b>SMFQ-P</b>											
Pre-treatment (n = 134)	7.50	(5.06)	7.43	(4.64)	7.57	(5.51)	G	0.37	0.71	0.68	0.93
Post-treatment	5.49	(5.49)	5.95	(5.06)	5.03	(4.76)	T	-0.30	-4.34***	-0.03	-2.80**
LTFU	4.35	(4.35)	4.57	(5.25)	4.13	(4.82)	I	0.33	2.03	-0.03	-1.70

Note. CSR = Clinical Severity Rating; G = Group; I = Interaction (all results obtained from Latent Growth Modeling in Mplus); LTFU = Long-Term Follow-Up; SCAS = Spence Children's Anxiety Scale, C = Child, P = Parent; SMFQ = Short Mood and Feelings Questionnaire, C = Child, P = Parent; T = Time.

\* p < 0.05.  
\*\* p < 0.01.  
\*\*\* p < 0.001.

**Table 4**  
Comparison of clinical improvement rates for principal diagnosis from pre- to post-treatment and long-term follow-up.

Status at post-treatment	Status at long-term follow-up				Total
	Recovery	Response	No change	Deterioration	
Recovery	43	4	6	3	56
Response	17	5	4	0	26
No change	26	8	18	1	53
Deterioration	1	0	2	1	4
Total	87	17	30	5	139

Note. Definition of the four categories relates to change in the clinical severity rating (CSR) of the principal diagnosis at post-treatment and at long-term follow-up in comparison with the pre-treatment CSR score. Definitions: *deterioration* = CSR increased by ≥ 2 points; *no change* = CSR changed ± 1 point; *response* = CSR decreased by ≥ 2 points; *recovery* = CSR decreased by ≥ 2 points and the score was ≤ 3.

anxiety diagnosis (± 0.94; 90% CI [-0.46, 0.71]). In contrast, equivalency was not established between the two treatment formats for SCAS-C (± 3.5; 90% CI [-6.25, 3.21]), SCAS-P (± 3.3; 90% CI [-5.38, 2.60]), SMFQ-C (± 0.84; 90% CI [-1.94, 1.56]), or SMFQ-P (± 0.62; 90% CI [-2.19, 1.08]).

**3.2.2. Diagnosis-specific outcomes**

Differences in outcomes for the three principal inclusion anxiety diagnoses were examined using multiple logistic regressions for diagnostic outcomes, with lack of diagnosis as the reference. p-LGM models

were estimated for all symptom measures, and both types of analyses were controlled for age, gender, and pre-treatment CSR of the participant's principal disorder. The ORs for loss of the respective principal anxiety diagnoses at long-term follow-up were: SOP, OR = 0.27 (95% CI [0.15, 0.51], p < 0.01); SAD, OR = 1.88 (95% CI [0.99, 3.57], p = 0.11); and GAD, OR = 4.03 (95% CI [1.54, 10.56], p = 0.02). At post-treatment, the corresponding values were: SOP, OR = 0.63 (95% CI [0.35, 1.13], p = 0.19); SAD, OR = 0.60 (95% CI [0.33, 1.13], p = 0.18); and GAD, OR = 4.44 (95% CI [2.07, 9.52], p < 0.001).

With GAD as the reference, logistic regression analyses estimated that the OR for loss of all inclusion anxiety diagnoses at long-term follow-up was not statistically significant neither for SOP (OR = 0.47, 95% CI [0.21, 1.05], p = 0.12) nor for SAD (OR = 0.60, 95% CI [0.26, 1.40], p = 0.32). Following the same analysis procedure, the OR for loss of the principal diagnosis at long-term follow-up was lower for SOP (OR = 0.16, 95% CI [0.06, 0.44], p < 0.01), but not for SAD (OR = 0.47, 95% CI [0.16, 1.34], p = 0.23). There were no significant differences in the measures of anxiety (SCAS-C/P) and depressive (SMFQ-C/P) symptom reduction between SAD and SOP, compared to GAD, at long-term follow-up (data not shown).

**4. Discussion**

The present study is the first to assess the long-term effectiveness of a CBT protocol for youth with mixed anxiety disorders (SAD, SOP, and/or GAD) delivered in community mental health clinics. Our findings confirmed loss of all inclusion anxiety diagnoses in 53% of participants, and loss of the principal anxiety diagnosis in 63%. Significant

improvement was also evident in the anxiety symptom measure, but not in youth-rated depressive symptoms. No differences in diagnostic and symptom outcome measures were found between ICBT and GCBT. Furthermore, our results indicated that, compared to GAD, the chance of loss of the principal diagnosis was significantly lower for youth with a principal diagnosis of SOP at inclusion.

Analysis of diagnostic treatment outcomes indicated a significant improvement from post-treatment to long-term follow-up. Almost 50% of youth that retained their principal and/or all inclusion anxiety diagnoses at post-treatment lost these diagnoses at long-term follow-up. Also, significant reduction in anxiety symptoms was evident. Analysis of CSR response of youth's principal diagnosis between post-treatment and long-term follow-up, generally indicated maintenance or improvement of the initial response at long-term follow-up. Thus, the results largely confirm improvement during the follow-up period. In comparison, other long-term outcome studies confirm maintenance of post-treatment results but not improvement (Ginsburg et al., 2014; Kendall et al., 2004; Saavedra et al., 2010). Several explanations for this continued improvement may apply. Outcomes at post-treatment were in the lower range compared to other effectiveness and efficacy trials (Bodden et al., 2008; James, James, Cowdrey, Soler, & Choke, 2015; Lau et al., 2010; Warwick et al., 2017), leaving more room for improvement. Furthermore, clinical severity rating (CSR) of the principal anxiety diagnosis, and anxiety symptom change demonstrated steeper reductions from pre to post, compared to post to long-term follow-up. Thus, the improvements may also relate to a delayed treatment effect, which may stem from a prolonged consolidation of acquired skills among youth and their parents (Ishikawa, Okajima, Matsuoka, & Sakano, 2007). Of notice; the treatment program used in this study consisted of 10 weekly sessions, whereas most other programs have 12–16 sessions (Bodden et al., 2008; Kendall et al., 1997). Thus, available time to conduct important CBT components such as exposure in this treatment protocol was limited. One may speculate whether youth had more time to implement and apply these skills after treatment, resulting in improved diagnostic outcomes. A final explanation may also be the effect of some spontaneous recovery among youth with anxiety disorders, as indicated by Nevo et al. (2014).

Our expectation that the long term outcomes in our effectiveness study would be below long term outcomes in efficacy studies was not consistently supported. In previous long-term efficacy studies reporting loss of all inclusion anxiety disorders, outcomes ranged from 47% to 86%, with an average mean follow-up of 9.5 years post-treatment and a weighted mean outcome of 53% (Barrett et al., 2001; Benjamin et al., 2013; Ginsburg et al., 2014). Our study result of 53% falls within the cited range and is consistent with the mean outcome from these studies. Regarding loss of the principal diagnosis, previous efficacy studies on long-term outcomes reported rates ranging between 65% and 90% (Ginsburg et al., 2014; Kendall et al., 2004), whereas the 63% loss of principal diagnosis in our study falls below the reported range. For long-term outcomes in youth with any anxiety disorder (with the exception of post-traumatic stress disorder and obsessive-compulsive disorder), treated with a broad scope of CBT formats, loss of all inclusion anxiety diagnoses has been reported with a mean outcome at 57% (range 47–68%), and loss of the principal anxiety diagnosis with a mean outcome of 77% (range 48–93%) (Gibby et al., 2017). The present results fall within these ranges, yet below the mean outcomes.

Several reasons might explain why the long-term improvement rates obtained in the present study are somewhat lower, compared to previous efficacy studies. Compared to patients from university clinics, youth with anxiety disorders treated in community clinics have been reported to have higher levels of anxiety symptoms and higher severity ratings of their principal anxiety diagnosis (Villabø, Cummings, Gere, Torgersen, & Kendall, 2013). In addition, in our sample, severity ratings at baseline for the principal diagnosis were greater than the CSR values reported in most other published studies in the field (mean CSR = 7.01) (Wergeland et al., 2014). Lower severity at pre-treatment

may reflect less severe anxiety disorders, which are more amenable to therapy and thus remain in remission once effectively treated (Ginsburg et al., 2011). Moreover, 46% of our study participants presented with a principal diagnosis of SOP, which is more than the percentage of youth with SOP included in other long-term follow-up studies, e.g., 27.3% in Benjamin et al. (2013) and 21.2% in Barrett et al. (2001). Several previous studies of generic CBT protocols have associated the diagnosis of SOP with poorer treatment outcomes (Hudson et al., 2015; Reynolds et al., 2012). Finally, whereas university clinics are dedicated to clinical research, the primary mandate of community clinics is the provision of healthcare services to the community. Thus, therapists in research clinics commonly have more extensive training in the particular treatments provided and usually have more focused caseloads, thus allowing for the development of greater competency in delivering the specific treatment (Weisz, Krumholz, Santucci, Thomassin, & Ng, 2015). Most therapists who participated in our study had little or no experience in CBT prior to their participation. This may also have contributed to the lower long-term improvement rates obtained.

Our study showed no differences between ICBT and GCBT in long-term outcomes. This finding is in line with findings from meta-analyses of studies on short-term outcomes (In-Albon & Schneider, 2006; Silverman et al., 2008), as well as the long-term outcome efficacy study by Saavedra et al. (2010). Of interest on this point, comparable outcomes were also reported for ICBT and family CBT (Kendall, Hudson, Gosch, Flannery-Schroeder, & Suveg, 2008). Our results add to the research literature by demonstrating the long-term outcomes of CBT for anxiety disorders in a community mental health setting and by including an analysis of equivalence. Equivalency between the two treatment formats of ICBT and GCBT was established in terms of change in CSR for the principal anxiety diagnosis, although not for the other diagnostic and symptom outcome measures. Thus, our study findings partially confirm our prediction of equivalence between treatment outcomes for ICBT versus GCBT.

Our results indicated that the chance of recovery, i.e. loss of the principal diagnosis, was significantly lower for youth with a principal diagnosis of SOP. This is in line with findings reported by Hudson et al. (2015) and Crawley et al. (2008) demonstrating lower post-treatment outcomes following CBT in youth with SOP, compared to those with GAD and SAD. Interestingly, the ORs for recovery varied between post-treatment and long-term follow-up, depending on the pre-treatment principal diagnosis. Whereas youth with GAD and SAD showed increased odds for loss of principal diagnosis from post-treatment to long-term follow-up, SOP carried a lower chance of recovery during this period. This result was not affected by gender, age, or pre-treatment CSR of the principal diagnosis. Thus, despite an initial positive response to treatment, the post-treatment outcome in participants with a principal diagnosis of SOP waned over time. This finding is in agreement with that of Kerns et al. (2013). Hudson et al. (2015) suggested that generic CBT protocols might not be adequate to address the more specific characteristics associated with SOP, such as negative self-statements and social expectations (Spence & Rapee, 2016). This could mean that youth with SOP need more extensive treatment, allowing for more sessions of individualized exposure and consolidation of acquired skills than what was possible with the current protocol. In this regard, a shift towards more exposure at an earlier time during the course of treatment may be conducive to outcome improvement (Ale, McCarthy, Rothschild, & Whiteside, 2015).

The current study features notable strengths. It is the largest study to date to examine the effectiveness of a CBT protocol in youth with mixed anxiety disorders in a community mental health setting. Participants were routine referrals to community clinics, and only few exclusion criteria were applied. Recruitment, assessment, and treatment were undertaken by clinicians working at the participating clinics. The study achieved a high rate of participation, a low rate of missing data and the inclusion of four assessment points allowed for the use of advanced statistical models. Taken together, these factors contribute to a

high degree of generalizability to other community mental health clinics.

The present study also has limitations. First, the use of the ADIS-C/P was limited to the SAD, SOP and GAD modules. Assessment of comorbidity was based on the DAWBA interview, which was used only at inclusion (see [Wergeland et al., 2014](#), for further details). Consequently, differential diagnoses and comorbidity based on the full ADIS-C/P could not be assessed, and the development of comorbid disorders through the trial and follow-up could therefore not be tracked. Functional outcomes were not included. The current assessment was cross-sectional, providing a brief glimpse of current symptoms and impairment. Although the study included a one-year follow-up assessment, data on the remission or recurrence of symptoms and diagnoses during follow-up was not available.

Another limitation of our study is the lack of a control group. This is an inherent limitation in most long-term follow-up studies, which prohibits causal associations between treatment and long-term outcome, given the influence of several likely confounding variables ([Nevo & Manassis, 2009](#); [Rith-Najarian et al., 2017](#)). In light of this, we cannot exclude spontaneous remission or maturational effects as possible contributing factors to the continued outcome improvements reported in our long-term follow-up study.

The study took place in Norway, which may influence the generalizability of the results. Whereas community mental health care services are free of charge for youth in Norway, many university based research clinics charge a service-fee based on household income ([Villabø et al., 2013](#)). This may contribute to systematic differences in who chooses to seek treatment and comparability between studies. Typical of many Norwegian community samples, the sample population was primarily Caucasian and the findings may therefore not apply to other ethnic groups ([Nilsen, Eisemann, & Kvermmo, 2013](#)). Norway is also commonly characterized by high living standards and fairly homogenous economic and social stratification ([Heiervang et al., 2007](#)). Thus the findings may not apply to youth groups within other socio-economic strata.

In conclusion, our study demonstrates long term effectiveness of CBT for mixed anxiety disorders in youth. These findings provide encouragement for the wider use and implementation of CBT in community mental health clinics. Furthermore, the comparable outcomes for ICBT and GCBT allow practitioners flexibility in the choice of treatment format when managing youth with SAD, SOP and/or GAD. Choice of treatment format is not dependent upon youth clinical factors, but can be based on patient or parent preferences, community clinic resources or referral rates. While a community setting differs from a university clinic setting in many respects, and thus can be assigned responsibility for lower treatment outcomes, from a long-term perspective, our study results indicate that the impact of these differences on treatment outcomes might be overestimated. However, while our findings lend support to the suitability of the treatment approach in the community setting, a significant number of youth in our study still met the criteria for an anxiety diagnosis at long-term follow-up. In conjunction, poorer outcomes for youth with a principal diagnosis of SOP were found. Identification of long-term outcome predictors and moderators to allow for more individual tailoring of treatment for youth with a principal diagnosis of SOP in particular, but also for youth with mixed anxiety disorders in general, is an important subject for future research.

#### Conflicts of interest

All authors declare no conflicts of interest.

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#### References

- Ale, C. M., McCarthy, D. M., Rothschild, L. M., & Whiteside, S. P. (2015). Components of cognitive behavioral therapy related to outcome in childhood anxiety disorders. *Clinical Child and Family Psychology Review*, 18, 240–251.
- Angold, A., Costello, E. J., Messer, S. C., & Pickles, A. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, 5, 237–249.
- Baldwin, S. A., Bauer, D. J., Stice, E., & Rohde, P. (2011). Evaluating models for partially clustered designs. *Psychological Methods*, 16, 149–165.
- Barrett, P. M., Dadds, M. R., & Rapee, R. M. (1991). *Coping koala workbook*. Nathan, Australia: School of Applied Psychology. Griffith University Unpublished manuscript.
- Barrett, P. M., Duffy, A. L., Dadds, M. R., & Rapee, R. M. (2001). Cognitive-behavioral treatment of anxiety disorders in children: Long-term (6-year) follow-up. *Journal of Consulting and Clinical Psychology*, 69, 135–141.
- Barrett, P. M. (2005). *FRIENDS for life: Group leaders manual for youth*. Brisbane: Australian Academic Press.
- Barrington, J., Prior, M., Richardson, M., & Allen, K. (2005). Effectiveness of CBT versus standard treatment for childhood anxiety disorders in a community clinic setting. *Behaviour Change*, 22, 29–43.
- Benjamin, C. L., Harrison, J. P., Settiani, C. A., Brodman, D. M., & Kendall, P. C. (2013). Anxiety and related outcomes in young adults 7 to 19 years after receiving treatment for child anxiety. *Journal of Consulting and Clinical Psychology*, 81, 865–876. <http://dx.doi.org/10.1037/a0033048>.
- Bjaastad, J. F., Haugland, B. S. M., Fjermestad, K. W., Torsheim, T., Havik, O. E., Heiervang, E. R., et al. (2016). Competence and Adherence Scale for Cognitive Behavioral Therapy (CAS-CBT) for anxiety disorders in youth: Psychometric properties. *Psychological Assessment*, 28, 908–916. <http://dx.doi.org/10.1037/pas0000230>.
- Bodden, D. H., Bögels, S. M., Nauta, M. H., De Haan, E., Ringrose, J., Appelboom, C., et al. (2008). Child versus family cognitive-behavioral therapy in clinically anxious youth: An efficacy and partial effectiveness study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 47, 1384–1394.
- Brown, T. A., Barlow, D. H., & Di Nardo, P. A. (1994). *Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV): Client interview schedule*. NY: Graywind Publications Incorporated.
- Brown, T. A., Di Nardo, P. A., Lehman, C. L., & Campbell, L. A. (2001). Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *Journal of Abnormal Psychology*, 110, 49–58.
- Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology*, 66, 7–18.
- Chorpita, B. F., Weisz, J. R., Daleiden, E. L., Schoenwald, S. K., Palinkas, L. A., Miranda, J., et al. (2013). Long-term outcomes for the Child STEPS randomized effectiveness trial: A comparison of modular and standard treatment designs with usual care. *Journal of Consulting and Clinical Psychology*, 81, 999–1009. <http://dx.doi.org/10.1037/a0034200>.
- 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 & Adolescent Psychiatry*, 53, 21–33.
- Costello, E. J., & Angold, A. (1988). Scales to assess child and adolescent depression: Checklists, screens, and nets. *Journal of the American Academy of Child & Adolescent Psychiatry*, 27, 726–737.
- Crawley, S. A., Beidas, R. S., Benjamin, C. L., Martin, E., & Kendall, P. C. (2008). Treating socially phobic youth with CBT: Differential outcomes and treatment considerations. *Behavioural and Cognitive Psychotherapy*, 36, 379–389. <http://dx.doi.org/10.1017/S1352465808004542>.
- Currie, C., Molcho, M., Boyce, W., Holstein, B., Torsheim, T., & Richter, M. (2008). Researching health inequalities in adolescents: The development of the Health Behavior in School-Aged Children (HBSC) and family affluence scale. *Social Science Medicine*, 66, 1429–1436.
- Gibby, B. A., Casline, E. P., & Ginsburg, G. S. (2017). Long-term outcomes of youth treated for an anxiety disorder: A critical review. *Clinical Child and Family Psychology Review*, 20, 201–225. <http://dx.doi.org/10.1007/s10567-017-0222-9>.
- Ginsburg, G. S., Kendall, P. C., Sakolsky, D., Compton, S. N., Piacentini, J., Albano, A. M., et al. (2011). Remission after acute treatment in children and adolescents with anxiety disorders: Findings from the CAMS. *Journal of Consulting and Clinical Psychology*, 79, 806–813.
- Ginsburg, G. S., Becker, E. M., Keeton, C. P., Sakolsky, D., Piacentini, J., Albano, A. M., et al. (2014). Naturalistic follow-up of youths treated for pediatric anxiety disorders. *JAMA Psychiatry*, 71, 310–318. <http://dx.doi.org/10.1001/jamapsychiatry.2013.4186>.
- Heiervang, E., Stormark, K. M., Lundervold, A. J., Heimann, M., Goodman, R., Posserud, M. B., et al. (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 & Adolescent Psychiatry*, 46(4), 438–447.
- Higa-McMillan, C. K., Francis, S. E., Rith-Najarian, L., & Chorpita, B. F. (2016). Evidence base update: 50 years of research on treatment for child and adolescent anxiety. *Journal of Child & Adolescent Psychology*, 45(2), 91–113.
- Hudson, J. L., Rapee, R. M., Lynham, H. J., McLellan, L. F., Wuthrich, V. M., &

- Schniering, C. A. (2015). Comparing outcomes for children with different anxiety disorders following cognitive behavioural therapy. *Behaviour Research and Therapy*, 72, 30–37. <http://dx.doi.org/10.1016/j.brat.2015.06.007>.
- Hunsley, J., & Lee, C. M. (2007). Research-informed benchmarks for psychological treatments: Efficacy studies, effectiveness studies, and beyond. *Professional Psychology: Research and Practice*, 38, 21–33.
- In-Albon, T., & Schneider, S. (2006). Psychotherapy of childhood anxiety disorders: A meta-analysis. *Psychotherapy and Psychosomatics*, 76, 15–24.
- Ishikawa, S. I., Okajima, I., Matsuoka, H., & Sakano, Y. (2007). Cognitive behavioural therapy for anxiety disorders in children and adolescents: A meta-analysis. *Child and Adolescent Mental Health*, 12(4), 164–172. <http://dx.doi.org/10.1111/j.1475-3588.2006.00433.x>.
- Jacobsen, N. S., & Truax, P. (1991). Clinical Significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59, 12–19.
- James, A. C., James, G., Cowdrey, F. A., Soler, A., & Choke, A. (2013). Cognitive behavioural therapy for anxiety disorders in children and adolescents. *Cochrane Database of Systematic Reviews*, 6, CD004690. <http://dx.doi.org/10.1002/14651858.CD004690.pub3>.
- James, A. C., James, G., Cowdrey, F. A., Soler, A., & Choke, A. (2015). Cognitive behavioural therapy for anxiety disorders in children and adolescents. *Cochrane Database of Systematic Reviews*, 2.
- Kendall, P. C., & Ollendick, T. H. (2004). Setting the research and practice agenda for anxiety in children and adolescence: A topic comes of age. *Cognitive and Behavioral Practice*, 11, 65–74. [http://dx.doi.org/10.1016/S1077-7229\(04\)80008-7](http://dx.doi.org/10.1016/S1077-7229(04)80008-7).
- Kendall, P. C., & Southam-Gerow, M. A. (1996). Long-term follow-up of a cognitive-behavioural therapy for anxiety-disordered youth. *Journal of Consulting and Clinical Psychology*, 64, 724–730. <http://dx.doi.org/10.1037/0022-006X.64.4.724>.
- Kendall, P. C., Flannery-Schroeder, E., Panichelli-Mindel, S. M., Southam-Gerow, M., Henin, A., & Warman, M. (1997). Therapy for youths with anxiety disorders: A second randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 65(3), 366–380. <http://dx.doi.org/10.1037/0022-006X.65.3.366>.
- Kendall, P. C., Safford, S., Flannery-Schroeder, E., & Webb, A. (2004). Child anxiety treatment: Outcomes in adolescence and impact on substance use and depression at 7.4-year follow-up. *Journal of Consulting and Clinical Psychology*, 72, 276–287. <http://dx.doi.org/10.1037/0022-006X.72.2.276>.
- Kendall, P. C., Hudson, J. L., Gosch, E., Flannery-Schroeder, E., & Suveg, C. (2008). Cognitive-behavioral therapy for anxiety-disordered youth: A randomized clinical trial evaluating child and family modalities. *Journal of Consulting and Clinical Psychology*, 76, <http://dx.doi.org/10.1037/0022-006X.76.2.282>.
- Kendall, P. C. (1990). *The C.A.T project therapist manual*. Ardmore, PA: Workbook Publishing.
- Kerns, C. M., Read, K. L., Klugman, J., & Kendall, P. C. (2013). Cognitive behavioral therapy for youth with social anxiety: Differential short and long-term treatment outcomes. *Journal of Anxiety Disorders*, 27, 210–215. <http://dx.doi.org/10.1016/j.janxdis.2013.01.009>.
- Lau, W., Chan, C. K., Li, J. C., & Au, T. K. (2010). Effectiveness of group cognitive-behavioral treatment for childhood anxiety in community clinics. *Behaviour Research and Therapy*, 48, 1067–1077.
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus User's Guide*. (8th ed.). Los Angeles, CA: Muthén & Muthén.
- Nauta, M. H., Scholing, A., Emmelkamp, P. M., & Minderaa, R. B. (2001). Cognitive behavioural therapy for anxiety disordered children in a clinical setting: Does additional cognitive parent training enhance treatment effectiveness? *Clinical Psychology & Psychotherapy*, 8, 330–340.
- Nauta, M. H., Scholing, A., Emmelkamp, P. M., & 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 & Adolescent Psychiatry*, 42, 1270–1278.
- Nevo, G. A., & Manassis, K. (2009). Outcomes for treated anxious children: A critical review of long-term follow-up studies. *Depression and Anxiety*, 26, 650–660. <http://dx.doi.org/10.1002/da.20584>.
- Nevo, A., Gili, W., Avery, D., Fiksenbaum, L., Kiss, A., Mendlowitz, S., et al. (2014). Eight years later: Outcomes of CBT-treated versus untreated anxious children. *Brain and Behavior*, 4(5), 765–774. <http://dx.doi.org/10.1002/brb3.274>.
- Nilsen, T. S., Eisemann, M., & Kvernmo, S. (2013). Predictors and moderators of outcome in child and adolescent anxiety and depression: A systematic review of psychological treatment studies. *European Child & Adolescent Psychiatry*, 22(2), 69–87. <http://dx.doi.org/10.1007/s00787-012-0316-3>.
- Puleo, C. M., Conner, B. T., Benjamin, C. L., & Kendall, P. C. (2011). CBT for childhood anxiety and substance use at 7.4-year follow-up: A reassessment controlling for known predictors. *Journal of Anxiety Disorders*, 25(5), 690–696. <http://dx.doi.org/10.1016/j.janxdis.2011.03.005>.
- Reynolds, S., Wilson, C., Austin, J., & Hooper, L. (2012). Effects of psychotherapy for anxiety in children and adolescents: A meta-analytic review. *Clinical Psychology Review*, 32, 251–262.
- Rith-Najarian, L. R., Park, A. L., Wang, T., Etchison, A. I., Chavira, D. A., & Chorpita, B. F. (2017). Applying new evidence standards to youth cognitive behavioral therapies: A review. *Behaviour Research and Therapy*, 90, 147–158. <http://dx.doi.org/10.1016/j.brat.2016.12.011>.
- Rogers, J. L., Howard, K. I., & Vessey, J. T. (1993). Using significance tests to evaluate equivalence between two experimental groups. *Psychological Bulletin*, 113, 553–565.
- Saavedra, L. M., Silverman, W. K., Morgan-Lopez, A. A., & Kurtines, W. M. (2010). Cognitive behavioral treatment for childhood anxiety disorders: Long-term effects on anxiety and secondary disorders in young adulthood. *Journal of Child Psychology and Psychiatry*, 51, 924–934.
- Santucci, L. C., Thomassin, K., Petrovic, L., & Weisz, J. R. (2015). Building evidence based interventions for the youth, providers, and contexts of real world mental health care. *Child Development Perspectives*, 9, 67–73. <http://dx.doi.org/10.1111/cdep.12118>.
- Sharp, C., Goodyer, I. M., & Croudace, T. J. (2006). The Short Mood and Feelings Questionnaire (SMFQ): A unidimensional item response theory and categorical data factor analysis of self-report ratings from a community sample of 7- through 11-year-old children. *Journal of Abnormal Child Psychology*, 34, 365–377.
- Silverman, W. K., & Albano, A. M. (1996). *Anxiety Disorders Interview Schedule (ADIS-IV) parent interview schedules*. Albany, NY: Greywind Publications.
- Silverman, W. K., & Kurtines, W. M. (1996). *Anxiety and phobic disorders: A pragmatic approach*. NY: Springer Science & Business Media.
- Silverman, W. K., & Nelles, W. B. (1988). The anxiety disorders interview schedule for children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 772–778.
- Silverman, W. K., Saavedra, L. M., & Pina, A. A. (2001). Test-retest reliability of anxiety symptoms and diagnoses with the anxiety disorders interview schedule for DSM-IV: Child and parent versions. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 937–944.
- Silverman, W. K., Pina, A. A., & Viswesvaran, C. (2008). Evidence-based psychosocial treatments for phobic and anxiety disorders in children and adolescents. *Journal of Clinical Child and Adolescent Psychology*, 37, 105–130.
- Smith, M. M., McLeod, B. D., Southam-Gerow, M. A., Jensen-Doss, A., Kendall, P. C., & Weisz, J. R. (2017). Does the delivery of CBT for youth anxiety differ across research and practice settings? *Behavior Therapy*, 48, 501–516. <http://dx.doi.org/10.1016/j.beth.2016.07.004>.
- Spence, S. H., & Rapee, R. M. (2016). The etiology of social anxiety disorder: An evidence-based model. *Behaviour Research and Therapy*, 86, 50–67. <http://dx.doi.org/10.1016/j.brat.2016.06.007>.
- Spence, S. H., Barrett, P. M., & Turner, C. M. (2003). Psychometric properties of the Spence Children's Anxiety Scale with young adolescents. *Journal of Anxiety Disorders*, 17, 605–625. [http://dx.doi.org/10.1016/S0887-6185\(02\)00236-0](http://dx.doi.org/10.1016/S0887-6185(02)00236-0).
- Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behaviour Research and Therapy*, 36, 545–566. [http://dx.doi.org/10.1016/S0005-7967\(98\)00034-5](http://dx.doi.org/10.1016/S0005-7967(98)00034-5).
- Villabo, M. A., Cummings, C. M., Gere, M. K., Torgersen, S., & Kendall, P. C. (2013). Anxious youth in research and service clinics. *Journal of Anxiety Disorders*, 27, 16–24. <http://dx.doi.org/10.1016/j.janxdis.2012.09.003>.
- Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using Mplus*. John Wiley & Sons. <http://dx.doi.org/10.1002/9781118356258>.
- Warwick, H., Reardon, T., Cooper, P., Murayama, K., Reynolds, S., Wilson, C., et al. (2017). Complete recovery from anxiety disorders following cognitive behavior therapy in children and adolescents: A meta-analysis. *Clinical Psychology Review*, 52, 77–91. <http://dx.doi.org/10.1016/j.cpr.2016.12.002>.
- Weisz, J. R., Kuppens, S., Eckshtain, D., Ugueto, A. M., Hawley, K. M., & Jensen-Doss, A. (2013). Performance of evidence-based youth psychotherapies compared with usual clinical care: A multilevel meta-analysis. *JAMA Psychiatry*, 70, 750–761.
- Weisz, J. R., Krumholz, L. S., Santucci, L., Thomassin, K., & Ng, M. Y. (2015). Shrinking the gap between research and practice: Tailoring and testing youth psychotherapies in clinical care contexts. *Annual Review of Clinical Psychology*, 11, 139–163. <http://dx.doi.org/10.1146/annurev-clinpsy-032814-112820>.
- Wergeland, G. J., Fjermestad, K. W., Marin, C. E., Haugland, B. S.-M., Bjaastad, J. F., Oeding, K., et al. (2014). An effectiveness study of individual vs. group cognitive behavioral therapy for anxiety disorders in youth. *Behaviour Research and Therapy*, 57, 1–12. <http://dx.doi.org/10.1016/j.brat.2014.03.007>.
- Wolk, C. B., Kendall, P. C., & Beidas, R. S. (2015). Cognitive-behavioral therapy for child anxiety confers long-term protection from suicidality. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54(3), 175–179. <http://dx.doi.org/10.1016/j.jaac.2014.12.004>.
- Wothke, W. (2000). Longitudinal and multigroup modeling with missing data. In T. D. Little, K. U. Schnabel, & J. Baumert (Eds.), *Modeling longitudinal and multilevel data* (pp. 269–281). Mahwah, NJ: Lawrence Erlbaum. <http://dx.doi.org/10.4324/9781410601940>.

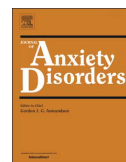






III





## Subtyping social anxiety in youth

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### ABSTRACT

Few empirical studies have examined subtypes of social anxiety disorder (SAD) in youth, and limited consensus resides on the nature of potential subtypes. Identifying subtypes, based on both fear and avoidance patterns, can help improve assessment and treatment of SAD.

Subtypes of fear and avoidance were examined in a sample comprising 131 youth (age 8–15 years) diagnosed with SAD using the Anxiety Disorders Interview Schedule for children and parents (ADIS-C/P). Exploratory factor analysis of fear responses revealed three factors, defining fear subtypes linked to: (1) performance, (2) observation, and (3) interaction situations, respectively. Exploratory factor analysis of avoidance responses showed these were best represented by one avoidance factor. Few youth qualified exclusively for either of the fear subtypes, thus calling into question the clinical utility of these subtypes. Nevertheless, the findings indicate distinct contributions of fear and avoidance in SAD presentation. This finding might help clinicians target and improve treatment of the disorder.

### 1. Introduction

Social anxiety disorder (SAD) is a prevalent mental disorder among youth, with lifetime prevalence reaching 9.2% at the age of 18 years (Merikangas et al., 2010). SAD onset is typically in childhood (Wittchen & Fehm, 2003). Although amenable to treatment, outcome seems to be less favorable for SAD than for other anxiety disorders among youth (Crawley, Beidas, Benjamin, Martin, & Kendall, 2008; Hudson et al., 2015; Wergeland et al., 2016), and SAD is associated with chronicity, psychiatric comorbidity, social impairment, and reduced quality of life (Burstein et al., 2011; Wittchen & Fehm, 2003). Symptoms of social anxiety may be observed in a wide range of social situations, and it is assumed that these situations congregate in discrete domains that trigger underlying fear dimensions, denoted by several researchers as SAD subtypes (Cox, Clara, Sareen, & Stein, 2008; Holt, Heimberg, Hope, & Liebowitz, 1992; Hook, Valentiner & Connelly, 2013). As such, these subtypes do not represent groupings of individuals, but represent manifestations of distinct underlying characteristics and processes that again relate to the fears that individuals with

SAD experience within certain fear domains. Identifying content-based subtypes of SAD can facilitate the identification of fear domains and underlying processes in youth with SAD. This may be one step towards improving diagnosis and treatment of the disorder (Bögels et al., 2010 Dalrymple & D'Avanzato, 2013).

The most recent edition of Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; American Psychiatric Association, 2013) introduced a content-based *performance-only* specifier (herein denoted as a performance-only subtype), describing fear restricted to public speaking and performance situations (Bögels et al., 2010). Within this categorical perspective it is assumed that individuals with predominantly performance fears are in some way categorically distinct from individuals with predominantly other SAD symptoms. A competing continuum perspective on SAD assumes that differences between affected individuals, is a result of the number of feared, and/or avoided social situations (Bögels et al., 2010). Although the continuum perspective has gained increasing support (Aderka, Nickerson & Hofman, 2012; Crome, Baillie, Slade, & Ruscio, 2010; Vriends, Becker, Meyer, Michael, & Margraf, 2007) the categorical vs.

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continuum issue remains debatable (Hook et al., 2013). Furthermore, in the sense that subtypes represent underlying dimensions and processes, there is an increasing recognition of the importance of maladaptive self-deficiency concerns or *core fears* in the development and maintenance of SAD (Moscovitch, 2009; Spence & Rapee, 2016). Such core fears relate to distinct fear situations and contexts in which the patient's perceived deficiencies are at risk of being revealed. These fears are not mutually exclusive or qualitatively distinct, but rather highly correlated and are often present simultaneously (Moscovitch, 2009).

Research on diagnostic subtypes of SAD, including the performance-only subtype in DSM-5, (American Psychiatric Association, 2013; Bögels et al., 2010) has been extensive, yet mainly based on adult samples (Dalrymple & D'Avanzato, 2013). Apart from the performance subtype, two other subtypes have been consistently confirmed across several adult studies, consisting of: (1) fear of social interaction, e.g., talking to strangers, and (2) fear of being observed by others, e.g., eating in public (Bögels et al., 2010; Cox et al., 2008). However, generalization of these findings to youth patients can be problematic, as contextual and developmentally related differences between youth and adults (e.g., living with parents, age related changes in fear profiles and the opportunity for avoidance) are known to influence SAD expression (Rao et al., 2007; Spence & Rapee, 2016; Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004). Therefore, it is relevant and clinically important to explore and compare if SAD subtypes identified in adult populations apply to youth populations.

Recently, two studies with youths have independently assessed rates and correlates of the performance-only subtype in a community and a treatment-seeking sample, respectively (Burstein et al., 2011; Kerns et al., 2013). Although with some discrepancies in subtype definition, Burstein et al. (2011) reported that only 0.7% in a community sample of 10,123 youth fulfilled criteria for a performance-only subtype, while Kerns et al. found no cases of the performance-only subtype in their clinical sample of 204 treatment seeking youth. On this basis, both studies called into question the validity and utility of the performance-subtype. These studies relied on clinically derived definitions of the subtype, as opposed to a statistically derived definition. This presupposes theoretical and preconceived conceptions of the meaning and relationships between fears. Thus, the specific fear situations on which Burstein et al. (2011) and Kerns et al. (2013) base their definition of a performance-only subtype differ. This highlights an important caveat not only in regards to the performance-only subtype, but also in regard to other clinically identified subtypes; which specific situations define the subtypes? The DSM-5 does not help in this concern, offering only a general description of the performance-only fears (American Psychiatric Association, 2013; Dalrymple & D'Avanzato, 2013). This leaves the definition of subtypes open to theoretical preference and interpretation. A statistical approach could help identify not only what situations might define subtypes, but, presupposing these subtypes represent underlying characteristics and processes, this approach might also help identify such dimensions.

In the few studies empirically investigating subtypes of SAD among children and youth, findings are inconsistent regarding the number and definition of identified subtypes. Subtypes identified in youth populations include one (i.e. general factor) (Knappe et al., 2011), two (i.e., interaction and performance; Piqueras, Olivares, & López-Pina, 2008), three (i.e., interaction, performance, and physical and cognitive symptoms associated with social anxiety; Cederlund & Öst, 2013), and five subtypes (i.e., assertiveness, public performance, physical/cognitive symptoms, social encounters, and avoidance; Aune, Stiles, & Svarva, 2008). Similar to most studies on subtypes of SAD in adults, the above mentioned studies differ in terms of population characteristics, assessment methods, and statistical methods, thus complicating both comparison and integration of results. Furthermore, the mentioned studies have specific shortcomings that limit the scope and interpretability of the findings. All the studies use moderately sized to very large populations (N = 108 in Cederlund & Öst, 2013;

N = 3021 in Knappe et al., 2011), yet with the exception of Cederlund & Öst (2013), these are all non-clinical samples. Furthermore, the use of a restricted measure of feared social situations, e.g., assessing only six social situations (Knappe et al., 2011), limits the number of subtypes identifiable. Assessing a broader scope of social situations captures more heterogeneity among fear situations and provides more statistical support in favor of the factors that might be identifiable (Wang & Wang, 2012). Finally, none of the mentioned studies analyzed both youth and parent data regarding the feared situations.

Fear of social situations and avoidance of social situations are core features of SAD (American Psychiatric Association, 2013; Clark & Wells, 1995; Rapee & Heimberg, 1997). However, in previous studies of SAD subtypes in both adults and youth, fear and avoidance have either been equated, or fear alone has been examined (Aderka et al., 2012; Burstein et al., 2011; Kerns et al., 2013; Vriends et al., 2007). A main reason for using such a study design is that avoidance and fear are often highly correlated and thus are assumed to follow the same subtype structure (Heimberg et al., 1999; Oakman, Van Ameringen, Mancini, & Farvolden, 2003). Rapee and Spence (2004), however, proposed that in youth, avoidance develops independently of social fear, in the sense that the typical onset of SAD in early adolescence is reflected in an increase in avoidance rather than any increase in social fear (Rapee & Spence, 2004). Thus, they suggest that the propensity to avoid distressful situations increases more with age than does the level of fear. This argument was supported by Sumter, Bokhorst, and Westenberg (2009) who examined age-related differences of avoidance and fear in youth across three predetermined fear domains. In the situational domain labeled as formal speaking/interactions, they demonstrated that fear and avoidance follow different paths with increased age, with avoidance demonstrating a steeper increase than fear (Sumter et al., 2009). These related yet independent developmental patterns of fear and avoidance might indicate a need for independent assessment of each of these aspects of SAD, and subsequent treatment plans that address each aspect discretely. No study has examined and compared empirically derived subtypes of SAD based on avoidance and fear separately.

In summary, it is unclear if subtypes identified in youth populations are comparable to subtype findings in adult populations. Furthermore, few studies of youth have used data-driven exploratory classification methods to examine and identify content-based SAD subtypes empirically, using broad, established measures of social fear, and assessing both youth and parents scores. No studies of youth have empirically examined the subtype structure of avoided situations and compared these to the subtype structure of feared situations. Thus, the present study aimed to examine empirically derived SAD subtypes based on social situations that are feared and/or avoided among help-seeking youth. Fear and avoidance of situations were assessed using The Anxiety Disorders Interview Schedule, Child and Parent version (ADIS-C/P; Silverman & Albano, 1996).

## 2. Methods

### 2.1. Participants

Participants were drawn from the child part of the Assessment and Treatment—Anxiety in Children and Adults (ATACA) study. The study is a randomized controlled trial (RCT) examining the effectiveness of cognitive behavioral therapy (CBT) for anxiety disorders in youth, compared to waitlist, and studying the comparative effectiveness of individual and group CBT delivered in outpatient clinics (Wergeland et al., 2014). Referred youth aged 8–15 years meeting DSM-IV criteria for SAD, separation anxiety disorder and/or generalized anxiety disorder were included. Youth with pervasive developmental disorder, psychotic disorder, severe conduct disorder, and/or mental retardation were excluded. In total, 182 youth were included. Of these participants,

131 youth met DSM-IV criteria for SAD as their primary, secondary or tertiary anxiety disorder, with a mean clinical severity rating (CSR) of 6.7 ( $SD = 1.3$ ), qualifying for inclusion in the present study. Further details on the RCT are provided elsewhere (Wergeland et al., 2014).

Among the included participants ( $n = 131$ ), mean age was 12 years ( $SD = 2.0$ ), 72 participants were girls (55.0%). In addition, the youth had the following comorbid disorders: separation anxiety disorder (50.0%), generalized anxiety disorder (72.5%), major depressive disorder (12.2%), specific phobia (9.9%), tic disorder (7.4%), attention-deficit/hyperactivity disorder (6.9%), oppositional defiant disorder (6.1%), obsessive-compulsive disorder (1.5%), eating disorder (1.5%), post-traumatic stress disorder (0.8%), and panic disorder with or without agoraphobia (0.8%). The mean number of comorbid anxiety disorders was 1.2 ( $SD = 0.7$ ), while mean number of all comorbid mental disorders was 1.7 ( $SD = 1.0$ ). The majority of the youth were Caucasian (90.8%), two were Asian (1.5%), and ethnicity was not reported for 11 participants (8.4%). The majority of the children lived in two-parent households (56.5%), 20.6% in a single-parent household, 13% in a household with one biological parent and one step-parent, and 1.5% in foster care. Family composition was unknown for six participants (4.6%). The occupational status of the parents was classified into rank-ordered social classes, in accordance with the Registrar General Social Class coding scheme (Currie et al., 2008). The family social class was defined by the highest ranking parent. Family social class was high for 29.0%, middle for 50.4%, and low for 9.2%. Social status was unknown for the remaining 11.5%.

## 2.2. Procedure and assessment

### 2.2.1. Diagnostic interview

The Anxiety Disorders Interview Schedule, Child and Parent version (ADIS-C/P; Silverman & Albano, 1996) was used to assess inclusion diagnoses. ADIS-C/P is a semi-structured diagnostic interview assessing child psychopathology according to the DSM-IV criteria (American Psychiatric Association, 2000). In the current study, only the interview modules for separation anxiety disorder, social anxiety, and generalized anxiety disorder were used. Children and parent(s) were interviewed separately, and the child- and parent-rated diagnosis and clinician's severity rating (CSR) were combined into a composite score (Silverman & Albano, 1996). The CSR scale ranges from 0 to 8, and a CSR of 4 or above is the threshold of the disorder (Silverman & Albano, 1996). The ADIS-C/P has demonstrated excellent inter-rater reliability, retest reliability, and concurrent validity (Lyneham, Abbott, & Rapee, 2007). In the current study, all diagnostic interviews were video-recorded. A random selection of 20% of these interviews was re-coded by expert raters blind to the assessor's initial rating. Inter-rater agreement for SAD diagnosis was excellent ( $k = 0.83$ ), and CSR ICC for SAD was 0.72.

The SAD module of the ADIS-C/P interview covers 23 situations in which youth may experience fear and/or show avoidance. If fear is confirmed, the child/parent is asked to rate the degree of fear experienced in relation to the specific situation, on a scale from 0 to 8. If the fear rating is 4 or above, the child/parent is asked to indicate whether the child avoids or endures the situation with considerable distress. Avoidance is scored as either "present = 1" or "not present = 0". The separate child and parent fear and avoidance ratings were combined into integrated scores. Thus, the highest fear rating, and presence of avoidance endorsed by either the child or the parent was carried forward into the integrated scores.

### 2.2.2. Interviewers

The study was conducted at seven public mental health outpatient clinics, servicing children and adolescents in Western Norway and covering both rural and urban areas. Interviews were performed by clinicians ( $N = 17$ ) employed at the participating clinics. These clinicians attended specific training for the ADIS-C/P in a two-day work-

shop with experienced ADIS-C/P raters and also received supervision of interviewers throughout the three-year inclusion period (2008–2011).

## 2.3. Statistical analyses

To investigate the existence of SAD subtypes based on the ratings of feared and avoided situations, we performed separate exploratory factor analyses (EFA) of the fear and avoidance items using structural equation modeling (SEM). SEM-based EFA determined the number of continuous latent variables needed to explain the correlations among the observed variables. Given the assumption that subtypes represent underlying processes and dimensions (Moscovitch & Huyder, 2011), we assumed them to be correlated, and for which reason we used an oblique rotation. An item was considered to load on a given factor if the factor loading for the item was greater than, or equal to, 0.30.

We examined the distribution of youth within the identified subtypes, and we examined whether youth with different SAD subtypes differed in age and SAD severity, using analyses of variance (ANOVAs) and correlation analyses ( $p < 0.05$ ).

Apart from the item "going on dates", none of the 23 fear/avoidance situations had missing answers exceeding 0.5% in total. The item "going on dates" was not used in the factor analyses, as this item in many cases was deemed inappropriate by the interviewer, given the age of the participants—two-thirds of the participants were 12 years old or younger. The item "other situations" was also excluded in the analyses, given the high heterogeneity in answer content. Little's missing completely at random (MCAR) test was non-significant, indicating data were missing completely at random. The missing data were accounted for by full information maximum likelihood missing data methodology (Wothke, 2000).

The program Mplus, version 7.31 (Muthén & Muthén, 2015), was used for the factor analyses, while the program SPSS 22 was used for the other analyses. The ratings of avoidance for the 21 items are binary, for which a weighted least squares means and variance estimator (WLSMV) is considered appropriate (Wang & Wang, 2012). In Mplus this variable is estimated as a tetrachoric correlation (Muthén & Muthén, 2015). This strengthens correlations and factor loadings, thus providing better identification of factors and reducing the negative impact (unbiased) on the factor outcome of the avoidance variable.

The answers to the fear items from the SAD section in the ADIS-C/P interview were non-normally distributed, mainly due to "zero" answers (i.e., no fear score, as no fear was confirmed). Therefore, a censored model was estimated with the maximum likelihood robust (MLR) estimator (Muthén & Muthén, 2015). A consequence of censoring is that commonly used goodness of fit indexes, such as root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker Lewis fit index (TLFI), cannot be used (Muthén & Muthén, 2015; Wang & Wang, 2012). Instead, Akaike information criterion (AIC) and sample size adjusted Bayesian information criterion (SABIC) were used to compare model fit (Yang, 2006).

## 2.4. Ethics

The study was approved by the Regional Committee for Medical and Health Research Ethics for Western Norway.

## 3. Results

### 3.1. Frequency of fear and avoidance

Out of a maximum of 21 feared situations, the mean number of situations receiving a fear score of 4 or higher was 10.0 ( $SD = 4.2$ , range 1–19) (Table 1). The mean number of avoided situations (when fear is present and rated 4 or higher) was 8.4 ( $SD = 3.8$ , range 1–18). The correlation between the number of clinical feared situations (fear

**Table 1**  
Percentage that fear a situation, percentage that avoid a situation and mean clinical severity rating among youth with SAD (n = 131).

Item number	Situation	Confirmed fear <sup>a</sup>	Confirmed avoidance <sup>b</sup>	Mean fear score
2	Giving a report or reading aloud in front of the class	75%	73%	6.7
14	Musical or athletic performances	73%	63%	6.4
1	Answering questions in class	62%	51%	6.0
5	Writing on the chalkboard	45%	39%	6.0
17	Talking to persons you don't know well	71%	65%	5.8
9	Starting or joining in on a conversation	60%	56%	5.4
16	Speaking to adults	53%	44%	5.4
3	Asking the teacher a question or for help	51%	45%	5.7
21	Being asked to do something that you really don't want to do, but you can't say no	51%	44%	5.1
12	Meetings such as girl or boy scouts or team meetings	34%	30%	5.8
15	Inviting a friend to get together	33%	26%	5.4
13	Answering or talking on the telephone	28%	24%	5.3
18	Attending parties, dances, or school activity nights	50%	35%	5.6
6	Working or playing with a group of kids	47%	34%	5.3
7	Gym class	39%	31%	5.8
8	Walking in the hallways or hanging out by your locker	37%	29%	5.4
11	Eating in front of others	21%	18%	5.4
4	Taking tests	44%	24%	5.3
10	Using school or public bathrooms	37%	37%	5.8
19	Having your picture taken	21%	16%	5.2
22	Having someone do something to you that you don't like, but you can't tell them to stop	62%	56%	6.1

<sup>a</sup> Confirmed fear is the percentage of clinical fear, i.e. fear score ≥ 4.

<sup>b</sup> Only rated if fear ≥ 4.

scores 4–8) and avoided situations was  $r = 0.93$  ( $p < 0.001$ ). Age was positively associated with sum of feared situations ( $R_{adj}^2 = 0.14$ ,  $F(1, 129) = 22.6$ ;  $p < 0.01$ ) and sum of avoided situations ( $R_{adj}^2 = 0.17$ ,  $F(1, 129) = 27.7$ ;  $p < 0.01$ ). There were significant gender differences regarding the sum of feared situations ( $t(131) = -2.36$ ;  $p < 0.05$ ) and avoided situations ( $t(131) = -2.18$ ;  $p < 0.05$ ), with girls displaying more fear and avoidance. There were no significant gender differences in relation to overall SAD severity ( $t(131) = -1.53$ ;  $p > 0.05$ ) or comorbid disorders ( $t(131) = -1.68$ ;  $p > 0.05$ ).

There were no significant correlations between social class and, respectively, SAD severity ( $r = -0.07$ ;  $p > 0.05$ ), feared situations ( $r = -0.05$ ;  $p > 0.05$ ), or avoided situations ( $r = -0.08$ ;  $p > 0.05$ ). There was no significant correlation between social anxiety severity and number of comorbid disorders ( $r = 0.13$ ;  $p > 0.05$ ).

The three most prevalent feared and avoided situations, confirmed among more than two-thirds of all the participants (71%), were “giving a report or reading aloud in front of the class” ( $n = 98$ ), “musical or athletic performances” ( $n = 96$ ), and “talking to a person you don't know well” ( $n = 93$ ). Apart from talking to unfamiliar people, these situations relate to performance-type situations. The three least prevalent feared situations, confirmed by less than one-third of all participants (30%), were “answering or talking on the phone” ( $n = 37$ ), “eating in front of others” ( $n = 28$ ), and “having your picture taken” ( $n = 28$ ). The latter two situations relate to observational-type situations.

### 3.2. Exploratory factor analysis of feared situations

Comparison of factor models of fear situations, based on their chi-square value difference, indicated significant improvement of model fit with each of the three first factors added. The AIC and SABIC criteria (Table 2) indicated that a four-factor model did not improve the model fit, although a five-factor model did. The interpretability of this five-factor model was, however, deemed poor – no apparent conceptual or clear domain coherence seemed to characterize the model (Wang & Wang, 2012). A three-factor solution was considered to provide the best statistical fit and conceptual coherence. Factor loadings are presented in Table 3. The labels “performance”, “observation”, and “interaction” were considered the most appropriate fitting labels for the domains. The correlation between the performance and observation factor was  $r = 0.25$ , between the performance and inter-

**Table 2**  
Comparison of fear models based on AIC and SABIC criterion.

Models compared	AIC <sup>a</sup>	SABIC <sup>b</sup>
1-factor against 2-factor	56	62
2-factor against 3-factor	26	32
3-factor against 4-factor	-7	-2
4-factor against 5-factor	30	35

<sup>a</sup> AIC: Akaike information criterion.

<sup>b</sup> SABIC: Sample Size adjusted information criterion.

action factor  $r = 0.29$ , and between the interaction and observation factor  $r = 0.43$ , all non-significant ( $p > 0.05$ ).

### 3.3. Exploratory factor analysis of avoided situations

The chi-square value difference indicated that a two-factor model of avoided situations added significantly increased goodness of fit ( $p = 0.049$ ), compared to a one-factor model, while models with an increasing number of factors did not significantly improve the model fit ( $p > 0.05$ ). This factor model is presented in Table 4. However, both models achieved close fit as measured by root mean square error of approximation (RMSEA): one-factor model  $RMSEA = 0.028$ , two-factor model  $RMSEA = 0.019$ . As is the case in all factor models, the factors need to be meaningful and interpretable (Wang & Wang, 2012). No clear cut domain coherence seemed to characterize the two-factor solution. Both factors contained items that overlapped in content and characteristics. For instance, item 3 “asking the teacher a question or for help”, and item 1 “answering questions in class” are similar in content yet load on different factors. Given these aspects, a unifactorial parsimonious model was considered to provide the most adequate fit.

### 3.4. Distribution of youth within the identified subtypes

Table 5 summarizes the distribution of youth within the different subtypes and the total number of subtypes the youth falls within. An increase in the number of subtypes the youth confirmed was associated with an increase in age and clinical severity, although only significantly in the case all three subtypes were present.

**Table 3**  
Exploratory factor analysis with oblique rotation of social situations feared among children with SAD (N = 131).

Item Number	Situation	Factors		
		Performance	Observation	Interaction
5	Writing on the chalkboard	<b>0.80</b>		
2	Giving a report or reading aloud in front of the class	<b>0.79</b>		
1	Answering questions in class	<b>0.76</b>		
14	Musical or athletic performances	<b>0.44</b>		
8	Walking in the hallways or hanging out by your locker		<b>0.80</b>	
7	Gym class		<b>0.61</b>	
6	Working or playing with a group of kids		<b>0.53</b>	
18	Attending parties, dances, or school activity nights		<b>0.49</b>	
11	Eating in front of others		<b>0.48</b>	
16	Speaking to adults			<b>0.92</b>
17	Talking to persons you don't know well			<b>0.56</b>
3	Asking the teacher a question or for help	0.40		<b>0.50</b>
12	Meetings such as girl or boy scouts or team meetings			<b>0.48</b>
13	Answering or talking on the telephone			<b>0.40</b>
15	Inviting a friend to get together		0.32	0.40
20	Being asked to do something that you really don't want to do, but you can't say no			<b>0.38</b>
9	Starting or joining in on a conversation	0.30		0.35
19	Having your picture taken		0.29	
21	Having someone do something to you that you don't like, but you can't tell them to stop		0.26	
4	Taking tests	0.25		
10	Using school or public bathrooms		0.10	

Note. Cutoff for retaining factor loadings in table is set at 0.30. Loadings for items 4, 10, 19 and 22 are included in the table, so as to indicate which factor they loaded the strongest on. Numbers in bold are significant at 5 % Level.

**Table 4**  
Exploratory factor analysis with oblique rotation of social situations avoided among children with SAD (N = 131).

Item Number	Situation	Factors	
		1	2
6	Working or playing with a group of kids	<b>0.83</b>	
3	Asking the teacher a question or for help	<b>0.64</b>	
20	Being asked to do something that you really don't want to do, but you can't say no	<b>0.64</b>	
16	Speaking to adults	<b>0.63</b>	
21	Having someone do something to you that you don't like, but you can't tell them to stop	<b>0.60</b>	
9	Starting or joining in on a conversation	<b>0.57</b>	0.40
18	Attending parties, dances, or school activity nights	<b>0.52</b>	
7	Gym class	0.36	
12	Meetings such as girl or boy scouts or team meetings	0.33	
17	Talking to persons you don't know well		0.32
10	Using school or public bathrooms		<b>1.00</b>
19	Having your picture taken		<b>0.79</b>
11	Eating in front of others		<b>0.74</b>
2	Giving a report or reading aloud in front of the class		<b>0.73</b>
1	Answering questions in class		<b>0.65</b>
15	Inviting a friend to get together		<b>0.49</b>
4	Taking tests		<b>0.46</b>
5	Writing on the chalkboard		0.38
8	Walking in the hallways or hanging out by your locker		0.36
13	Answering or talking on the telephone		0.32
14	Musical or athletic performances		0.32

Note. Cutoff for retaining factor loadings in the table is set at 0.30. Loadings for item 9 are included in the table so as to indicate which factor it loads the strongest on. Numbers in bold are significant at 5 % Level.

### 3.5. Subtypes, avoidance and relation to age

To test whether age had differing associations with the identified fear subtypes, ANOVAs were conducted. The analyses demonstrated significant and differing age-explained proportions of fear variances with the three subtypes: performance subtype:  $R_{adj}^2 = 12.4, F(1, 129)$

$= 19.34, p < 0.01$ ; interaction subtype:  $R_{adj}^2 = 7.5, F(1, 129) = 11.61, p < 0.01$ ; and observation subtype:  $R_{adj}^2 = 12.1, F(1, 129) = 18.70, p < 0.01$ . For all subtypes, older youth demonstrated higher fear scores than younger youth. Avoidance similarly increased with age ( $R_{adj}^2 = 17.1, F(1, 129) = 27.7; p < 0.01$ ), and showed a stronger association with age than fear.

## 4. Discussion

Using a broad, well-established measure assessing 21 social anxiety situations, it was possible to distinguish three distinct content-based subtypes of SAD among clinically referred youth. The subtypes were labeled “performance”, “observation”, and “interaction”, representing three non-significantly correlated fear dimensions. These findings are somewhat different to other empirical results in studies of SAD subtypes among children and youth, although in line with results among adult studies. Our findings did not support the utility of the DSM-5 performance- only subtype (American Psychiatric Association, 2013). The factor analysis of avoidance provided a one-factor solution as the best fitting model, conceptually and statistically. The three subtypes demonstrated varying age associations and age was also differentially associated with sum of feared situations and sum of avoided situations. On this basis we argue that fear and avoidance capture discrete aspects of SAD, in accordance with recent social anxiety theory (Spence & Rapee, 2016). This distinction may prove important regarding assessment and treatment.

The identified SAD subtypes of performance and interaction are consistent with those identified in youth by Piqueras et al. (2008) and Cederlund and Öst (2013), with exception of the subtype “observation”. Aune et al. (2008) similarly identified a performance subtype, yet also four other dissimilar subtypes not identified in this study. Furthermore, Knappe et al. (2011) identified a single general type. This lack of comparability may relate primarily to methodological differences, such as assessment instrument used and population composition (age, comorbidity, community versus clinical) (Dalrymple & D’Avanzato, 2013; Hofmann, Heinrichs, & Moscovitch, 2004). These diverging differences challenge comparison and integration of the results.

A central discussion is the comparability and also applicability of adult findings to youth populations (and vice versa). At face value, the



**Table 5**  
Number of participants experiencing fear within subtypes and clinical differences.

Number of subtypes	Total N	Individuals with subtype			Mean/(SD) comorbid anxiety disorder	Mean age/(SD)	Total clinical severity rating
		Performance	Observation	Interaction			
One subtype	6	2	1	3	1.33 (0.82)	10.33 (1.63)	5.50
Two subtypes	24	20	5	23	1.30 (0.77)	10.88 (1.94)	6.00
Three subtypes	101	101	101	101	1.21 (0.73)	12.31 (1.96) <sup>a</sup>	6.90 <sup>b</sup>

<sup>a</sup> Significant difference compared to one and two subtypes at  $p < 0.05$ . One subtype;  $t(105) = -2.42$ ; two subtypes;  $t(123) = -3.23$ .

<sup>b</sup> Significant difference compared to one and two subtypes at  $p < 0.01$ . One subtype;  $t(105) = -2.92$ ; two subtypes;  $t(123) = -3.94$ .

three identified subtypes, performance, interaction, and observation, are congruent with the examples of situational domains of social anxiety given in Criteria A of the disorder in DSM-5 (American Psychiatric Association, 2013) and adult studies on SAD (Cox et al., 2008). However, this does not necessarily imply that the identified social dimensions are the same: the contextual differences between children and adults vary, as well as cultural, personal, developmental and environmental factors, that all influence and contribute to the fears that a youth or an adult experiences in social situations (Spence & Rapee, 2016; Weems & Costa, 2005). More specifically in relation to the performance subtype, Bögels et al. (2010) argued that children are not expected to “perform” or undergo public formal evaluations until the adolescent years. However, in our study, the items loading onto the performance subtype consisted of primarily school activities that are expected, even in the early grades (see Table 3 for details on the specific situations loading onto the subtype). These situations are very much performance-related, and the youth is subject to public (co-pupil) formal evaluations in these situations. Thus, the specific content of a “public” situation differs from adults in regards to the setting and the observers. Such differences in the defining content characteristics of the subtypes among youth, would also apply to the subtypes interaction and observation, in comparison to adults. This means that any comparison and application of a subtyping scheme across age groups must inevitably accommodate such differences in context and environment. Specifically regarding the performance-only subtype as defined in DSM-5 (American Psychiatric Association, 2013) we would argue this definition does accommodate such content differences. Our findings provide more detailed information on the defining context characteristics of the subtype in a youth population, which naturally differs from adults.

Statistically, our results support the existence of a performance subtype in the sample. Although we relied on an oblique rotation, thus violating the criteria of exclusivity inherent in the definition (American Psychiatric Association, 2013), the results nevertheless demonstrated a small non-significant correlation between the performance factor and the other two factors, indicating a near orthogonal (non-correlated) solution. We therefore argue that the identified model does speak to the DSM-5 performance subtype, adding construct validity to this subtype. However, when counting how many youth in fact exclusively met criteria for the subtype in the sample, we identified only two individuals. Accepting some discrepancy between definitions of the subtype, this finding is in line with that of Kerns et al. (2013) and Burstein et al. (2011), who similarly sought to identify the number of individuals fulfilling criteria for the performance-only subtype. Both studies identified similar low numbers. Thus, these results pose a serious challenge to the validity and utility of the subtype. Regarding the observation and interaction subtypes, we identified respectively one and two youths who exclusively feared situations within these subtypes, warranting the same conclusion.

The majority of the youth (78%) in our study feared situations in all three subtypes. Similarly, Kerns et al. (2013) classified 64% of their sample to fear situations, covering all three fear domains, while Burstein et al. (2011), found that 56% of their sample feared more

than 7 out of 12 fear situations assessed. The larger proportion of youth with multiple fears in our study may be ascribed to the greater severity of the SAD disorder among the participants drawn from community clinics compared to the university-based clinical sample in the Kerns et al. (2013) study. Mean CSR score of our sample was 6.7 ( $SD$  1.3) and mean CSR in the Kerns et al. (2013) study was 5.3 ( $SD$  not reported). In extension of this, our results indicated a significant relationship between mean CSR rating and number of subtypes the individual confirmed, in comparison to individuals confirming fewer subtypes (Table 5). Similarly age was positively associated with an increase in the sum of fears and avoidance. Taken together, these results can indicate that as the child and youth grow older, the intensity and severity of the disorder increases and (s)he is more likely to experience fear across several domains.

Concerning the different relationships between age and fear within the subtypes, the performance and observation subtypes demonstrated a similar and stronger age association than the interaction subtype. An explanation for this increase could be a change in the fears towards more social evaluative fears in the older youth versus the younger youth (Weems & Costa, 2005). As such, performance and observational situations possess more evaluative aspects than interactional situations. Girls in general exhibit more fear and SAD symptoms than boys (Rao et al., 2007; Beidel and Alfano, 2005), and Essau, Conrath, and Petermann (1999) found that girls reported more fears than boys, in regards to the situation involving “doing something in front of people”. The situations within the performance and observation subtypes all involve activities in front of others. This could help explain the finding that girls feared more situations than boys.

In sum, the current evidence supporting the validity and utility of content-based subtypes in youth is meager, thus questioning the use of these subtypes. A basic assumption in our study was that subtypes are not groupings of individuals, but represent underlying characteristics or processes relating to maladaptive self-deficiency concerns. Two recent theories of social anxiety state, that a core defining feature of the disorder is a “distorted, negative view of self” denoted *core fears* (Moscovitch, 2009) or described as maladaptive beliefs about the self (2016), regarding attributes and likeableness. These self-characteristics are perceived as deficient and at odds with perceived societal expectations and norms (Moscovitch, 2009), and are thought to have a detrimental effect on the individual, if exposed to public scrutiny or critical others. These core fears fall into three broad correlated dimensions: 1) concerns about social competence; 2) concerns about physical appearance; 3) concerns about revealing anxiety symptoms (Moscovitch & Huyder, 2011). The results of our factor analysis seem to match the fear triggers and the fear domains, to which these core concerns map onto, that is: social competence – interaction subtype; physical appearance- observation subtype; revealing anxiety symptoms – performance subtype. On this basis, we hypothesize that these core beliefs are the underlying processes that result in the confirmed distribution of social anxiety subtypes we identified. Uncovering and classifying these possible underlying core fears via subtype identification, may help classify and better tailor the treatment to these individual differences that are expressed through the specific fears of the individual.

In the analysis of possible SAD subtypes based on avoided situations, a uni-dimensional solution was assessed as the best fitting model. As such and in comparison to fear subtypes, avoidance of social situations is not situationally bound but is better described as a behavior more or less present across feared social situations. Thus, the avoidance factor is more in line with a continuum model of social anxiety (sum of fear and avoidance predicts severity), whereas fear subtypes comply with a categorical perspective. This finding is relevant to the continuum vs. categorical debate within the subtype discourse. The finding highlights that it is perhaps not a question of the eligibility of one perspective over the other, but rather *within* which *areas* a continuum versus categorical model can be best suited to describe and understand the heterogeneity of the disorder. In extension of this, we can thus assume that avoidance is a generalizable behavior across the feared situations of an individual, whereas the fear reaction or distress pertaining to the identified domains is not generalizable across subtypes.

We found that avoidance increased with age, similarly to the sum of fears, although fear develops at differing rates within the different subtypes. This can be interpreted as evidence that fear and avoidance tap into different aspects of SAD, and that fear and avoidance follow related, yet distinct, paths in relation to age. This argument is supported by the findings of Sumter et al. (2009) that demonstrated unique developmental paths of fear and avoidance within SAD subtypes. Rao et al. (2007) also suggested that different developmental paths of fear and avoidance relate to the youth's opportunity for avoidance, which they argue increases with higher age. These findings are also in accordance with general SAD theory (Spence & Rapee, 2016), stating that avoidance not only is a reaction to fear, but also contributes to a strengthening of fear, by minimizing the opportunity of disconfirmation of underlying automatic thoughts.

#### 4.1. Limitations

Certain limitations of our study warrant comment. Our results are based on a sample of treatment-seeking youth with SAD and may therefore not be generalizable beyond similar populations. Further research will be needed to assess if the identified factor structures are generalizable to other samples. Concerning assessment of the conceptually best fitting model in regards to both fear and avoided situations, this assessment relies in some part on interpretation of item commonalities and factor coherence. We assessed that avoidance is best represented by one factor, as the two-factor solution proved difficult to interpret. However, this assessment and conclusions drawn from it should be considered with caution, given that other interpretations are possible.

We hypothesize that the underlying distinct processes responsible for the division into three manifest SAD subtypes can be core fears, or concerns pertaining to maladaptive self-concerns. We did not in this study investigate these core fears more specifically, leaving this hypothesis open for further investigation. Regarding adequate sample size in SEM analysis, there are no absolute standards. The EFA analysis performed is based on a sample size of 131, i.e., between recommendations given in the literature ( $N = 100$  to  $N = 200$ ), for which reason the statistical power of the analysis might be somewhat reduced (Wang & Wang, 2012). Further studies are needed to confirm the identified factor structures. The ADIS-C/P interview assesses avoidance of social situations when fear of a social situation is rated "4" or above. Thus, some avoided situations might not have been assessed, given that the fear rating was below the cutoff. Accordingly, we cannot rule out that a given situation has a low fear rating because the situation is avoided. This is an inherent limitation in the ADIS-C/P interview, thus also of our results. We did not have behavioral observation data available to confirm the existence and degree of avoidance reported by the child and parent.

#### 4.2. Clinical implications

Our findings may contribute with important information when planning and delivering therapy. In terms of treatment planning, it may be important to assess avoidance separately from fear. Youth with anxiety problems may under-report their fears because they consistently avoid feared situations. Assessing avoided situations independently from feared situations, e.g., as separate domains in an interview or with different questionnaires, may elicit this information for better targeted treatment. In terms of treatment delivery, results from generic programs designed for several anxiety disorders may improve if the exposure tasks involved deal with the associated automatic thoughts within the separate fear domains rather than across a spectrum of social anxiety situations. Furthermore, in the case our hypothesis is confirmed, that subtypes do reflect underlying differences in maladaptive core self-concerns, Moscovitch & Huyder (2011) similarly state that treatment response varies in relation to these concerns. This entails that treatment should be tailored to the specific core fears. Thus, addressing and focusing on both the specific fears and underlying maladaptive self-beliefs, alongside the behavioral component consisting of avoidance, may prove effective in assessment and treatment delivery.

#### 5. Conclusions

The present study identified three distinct content-based subtypes of SAD in treatment-seeking youth: performance, observation, and interaction. These subtypes are similar to those reported in adult studies and partly in youth studies, even though only the performance subtype is formally accepted (American Psychiatric Association, 2013). Although the results confirm the existence of a performance-only subtype, very few youth qualify for the subtype, calling into question the validity and utility of this subtype. Avoidance does not follow the same factor structure as the fear domains. Rather fear and avoidance seem to follow distinct paths also in relation to age, indicating unique contributions to the disorder. Careful assessment of possible subtypes could allow for more targeted treatment given that treatment gains are most likely not generalizable across the subtypes, as the subtypes might represent distinct underlying core fears. This is most likely not needed regarding avoidance, which, given a unitary structure, can be addressed independently of the situation in which the behavior is present.

Future investigations of subtypes in youth should include broader populations and differentiated outcome results in relation to fear subtypes and avoidance. Further analysis of the hypothesized link between subtypes and underlying core fears would allow for more thorough identification and understanding of the processes involved in the development and maintenance of SAD. Information of subtypes could inform assessment and treatment of youth and adults with SAD.

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#### References

- Aderka, I. M., Nickerson, A., & Hofmann, S. G. (2012). Admixture analysis of the diagnostic subtypes of social anxiety disorder: implications for the DSM-V. *Journal of Behavior Therapy and Experimental Psychiatry*, 43, 752–757. <http://dx.doi.org/10.1016/j.jbtep.2011.10.012>.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed. rev. text). Washington, D.C: American Psychiatric Pub.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Pub.
- Aune, T., Stiles, T. C., & Svarva, K. (2008). Psychometric properties of the social phobia and anxiety inventory for children using a non-American population-based sample. *Journal of Anxiety Disorders*, 22, 1075–1086. <http://dx.doi.org/10.1016/j.janxdis.>

- 2007.11.006.
- Bögels, S. M., Alden, L., Beidel, D. C., Clark, L. A., Pine, D. S., Stein, M. B., et al. (2010). Social anxiety disorder: Questions and answers for the DSM-V. *Depression and Anxiety*, 27, 168–189. <http://dx.doi.org/10.1002/da.20670>.
- Beidel, D. C., & Alfano, C. A. (2005). *Childhood anxiety disorders*. New York: Routledge Taylor & Francis Group.
- Burstein, M., He, J. P., Kattan, G., Albano, A. M., Avenevoli, S., & Merikangas, K. R. (2011). Social phobia and subtypes in the national comorbidity survey-adolescent supplement: Prevalence, correlates, and comorbidity. *Journal of the American Academy of Child and Adolescent Psychiatry*, 50, 870–880. <http://dx.doi.org/10.1016/j.jaac.2011.06.005>.
- Cederlund, R., & Öst, L.-G. (2013). Psychometric properties of the social phobia and anxiety inventory-child version in a Swedish clinical sample. *Journal of Anxiety Disorders*, 27, 503–511. <http://dx.doi.org/10.1016/j.janxdis.2013.06.004>.
- Clark, D. M., & Wells, A. (1995). *A cognitive model of social phobia*. The Guilford Press: New York.
- Cox, B. J., Clara, I. P., Sareen, J., & Stein, M. B. (2008). The structure of feared social situations among individuals with a lifetime diagnosis of social anxiety disorder in two independent nationally representative mental health surveys. *Behaviour Research and Therapy*, 46, 477–486. <http://dx.doi.org/10.1016/j.brat.2008.01.011>.
- Crawley, S. A., Beidas, R. S., Benjamin, C. L., Martin, E., & Kendall, P. C. (2008). Treating socially phobic youth with CBT: Differential outcomes and treatment considerations. *Behavioural and Cognitive Psychotherapy*, 36, 379–389. <http://dx.doi.org/10.1017/S1352465808004542>.
- Crome, E., Baillie, A., Slade, T., & Ruscio, A. M. (2010). Social phobia: Further evidence of dimensional structure. *Australian and New Zealand Journal of Psychiatry*, 44, 1012–1020.
- Currie, C., Molcho, M., Boyce, W., Holstein, B., Torsheim, T., & Richter, M. (2008). Researching health inequalities in adolescents: The development of the health behaviour in school-aged children (HBSC) family affluence scale. *Social Science & Medicine*, 66, 1429–1436. <http://dx.doi.org/10.1016/j.socscimed.2007.11.024>.
- Dalrymple, K., & D'Avanzato, C. (2013). Differentiating the subtypes of social anxiety disorder. *Expert Review of Neurotherapeutics*, 13, 1271–1283. <http://dx.doi.org/10.1586/14737175.2013.853446>.
- Essau, C. A., Conradt, J., & Petermann, F. (1999). Frequency and comorbidity of social phobia and social fears in adolescents. *Behavior Research and Therapy*, 37, 831–843. [http://dx.doi.org/10.1016/s0005-7967\(98\)00179-x](http://dx.doi.org/10.1016/s0005-7967(98)00179-x).
- Heimberg, R. G., Horner, K. J., Juster, H. R., Safren, S. A., Brown, E. J., Schneier, F. R., et al. (1999). Psychometric properties of the Liebowitz Social Anxiety Scale. *Psychological Medicine*, 29, 199–212. <http://dx.doi.org/10.1017/s0033291798007879>.
- Hofmann, S. G., Heinrichs, N., & Moscovitch, D. A. (2004). The nature and expression of social phobia: Toward a new classification. *Clinical Psychology Review*, 24, 769–797. <http://dx.doi.org/10.1016/j.cpr.2004.07.004>.
- Holt, C. S., Heimberg, R. G., Hope, D. A., & Liebowitz, M. R. (1992). Situational domains of social phobia. *Journal of Anxiety Disorders*, 6, 63–77. [http://dx.doi.org/10.1016/0887-6185\(92\)90027-5](http://dx.doi.org/10.1016/0887-6185(92)90027-5).
- Hook, J. N., Valentiner, D. P., & Connelly, J. (2013). Performance and interaction anxiety: Specific relationships with other- and self-evaluation concerns. *Anxiety Stress and Coping*, 26(2), 203–216. <http://dx.doi.org/10.1080/10615806.2012.654777>.
- Hudson, J. L., Rapee, R. M., Lynham, H. J., McLellan, L. F., Wuthrich, V. M., & Schniering, C. A. (2015). Comparing outcomes for children with different anxiety disorders following cognitive behavioural therapy. *Behaviour Research and Therapy*, 72, 30–37. <http://dx.doi.org/10.1016/j.brat.2015.06.007>.
- Kerns, C. E., Comer, J. S., Pincus, D. B., & Hofmann, S. G. (2013). Evaluation of the proposed social anxiety disorder specifier change for DSM-5 in a treatment-seeking sample of anxious youth. *Depression and Anxiety*, 30, 709–715. <http://dx.doi.org/10.1002/da.22067>.
- Knappe, S., Beesdo-Baum, K., Fehm, L., Stein, M. B., Lieb, R., & Wittchen, H. U. (2011). Social fear and social phobia types among community youth: differential clinical features and vulnerability factors. *Journal of Psychiatric Research*, 45, 111–120. <http://dx.doi.org/10.1016/j.jpsychires.2010.05.002>.
- Lynham, H. J., Abbott, M. J., & Rapee, R. M. (2007). Interrater reliability of the anxiety disorders interview schedule for DSM-IV: Child and parent version. *Journal of the American Academy of Child & Adolescent Psychiatry*, 46, 731–736. <http://dx.doi.org/10.1097/chi.0b013e3180465a09>.
- Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., et al. (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 Adolescent Psychiatry*, 49, 980–989. <http://dx.doi.org/10.1016/j.jaac.2010.05.017>.
- Moscovitch, D. A., & Huyder, V. (2011). The negative self-portrayal scale: Development, validation, and application to social anxiety. *Behavior Therapy*, 42, 183–196. <http://dx.doi.org/10.1037/a003332.000>.
- Moscovitch, D. A. (2009). What is the core fear in social phobia? A new model to facilitate individualized case conceptualization and treatment. *Cognitive and Behavioral Practice*, 16, 123–134. <http://dx.doi.org/10.1016/j.cbpra.2008.04.002>.
- Muthén, L. K., & Muthén, B. O. (2015). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Oakman, J., Van Ameringen, M., Mancini, C., & Fardolden, P. (2003). A confirmatory factor analysis of a self-report version of the Liebowitz Social Anxiety Scale. *Journal of Clinical Psychology*, 59, 149–161. <http://dx.doi.org/10.1002/jclp.10124>.
- Piqueras, J. A., Olivares, J., & López-Pina, J. A. (2008). A new proposal for the subtypes of social phobia in a sample of Spanish adolescents. *Journal of Anxiety Disorders*, 22, 67–77. <http://dx.doi.org/10.1016/j.janxdis.2007.01.007>.
- Rao, P. A., Beidel, D. C., Turner, S. M., Ammerman, R. T., Crosby, L. E., & Sallee, F. R. (2007). Social anxiety disorder in childhood and adolescence: Descriptive psychopathology. *Behaviour Research and Therapy*, 45, 1181–1191. <http://dx.doi.org/10.1016/j.brat.2006.07.015>.
- Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, 35, 741–756. [http://dx.doi.org/10.1016/S0005-7967\(97\)00022-3](http://dx.doi.org/10.1016/S0005-7967(97)00022-3).
- Rapee, R. M., & Spence, S. H. (2004). The etiology of social phobia: Empirical evidence and an initial model. *Clinical Psychology Review*, 24, 737–767. <http://dx.doi.org/10.1016/j.cpr.2004.06.004>.
- Silverman, W. K., & Albano, A. M. (1996). *Anxiety disorders interview schedule for DSM-IV: Parent interview schedule, vol. 1*. Oxford University Press.
- Spence, S. H., & Rapee, R. M. (2016). The etiology of social anxiety disorder: An evidence-based model. *Behavior Research and Therapy*. <http://dx.doi.org/10.1016/j.brat.2016.06.007>.
- Sumter, S., Bokhorst, C., & Westenberg, P. M. (2009). Social fears during adolescence: Is there an increase in distress and avoidance? *Journal of Anxiety Disorders*, 23, 897–903. <http://dx.doi.org/10.1016/j.janxdis.2009.05.004>.
- Vriends, N., Becker, E. S., Meyer, A., Michael, T., & Margraf, J. (2007). Subtypes of social phobia: Are they of any use? *Journal of Anxiety Disorders*, 21, 59–75. <http://dx.doi.org/10.1016/j.janxdis.2006.05.002>.
- Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using mplus*. John Wiley & Sons. <http://dx.doi.org/10.1002/9781118356258>.
- Weems, C. F., & Costa, N. M. (2005). Developmental differences in the expression of childhood anxiety symptoms and fears. *Journal of the American Academy of Child & Adolescent Psychiatry*, 44. <http://dx.doi.org/10.1097/01.chi.0000162583.25829.4b>.
- Wergeland, G. J. H., Fjermestad, K. W., Marin, C. E., Haugland, B. S.-M., Bjaastad, J. F., Oeding, K., et al. (2014). An effectiveness study of individual vs. group cognitive behavioral therapy for anxiety disorders in youth. *Behaviour Research and Therapy*, 57, 1–12. <http://dx.doi.org/10.1016/j.brat.2014.03.007>.
- Wergeland, G. J. H., Fjermestad, K. W., Marin, C. E., Bjelland, I., Haugland, B. S.-M., Silverman, W. K., et al. (2016). Predictors of treatment outcome in an effectiveness trial of cognitive behavioral therapy for children with anxiety disorders. *Behaviour Research and Therapy*, 76, 1–12. <http://dx.doi.org/10.1016/j.brat.2015.11.001>.
- Westenberg, M. P., Drewes, M. J., Goedhart, A. W., Siebelink, B. M., & Treffers, P. D. A. (2004). A developmental analysis of self-reported fears in late childhood through mid-adolescence: Social-evaluative fears on the rise? *Journal of Child Psychology and Psychiatry*, 45. <http://dx.doi.org/10.1111/j.1469-7610.2004.00239.x>.
- Wittchen, H. U., & Fehm, L. (2003). Epidemiology and natural course of social fears and social phobia. *Acta Psychiatrica Scandinavica*, 108, 4–18. <http://dx.doi.org/10.1034/j.1600-0447.108.s417.1.x>.
- Wothke, W. (2000). Longitudinal and multigroup modeling with missing data. In T. D. Little, K. U. Schnabel, & J. Baumert (Eds.), *Modeling longitudinal and multilevel data* (pp. 269–281). Mahwah, NJ: Lawrence Erlbaum. <http://dx.doi.org/10.4324/9781410601940>.
- Yang, C.-C. (2006). Evaluating latent class analysis models in qualitative phenotype identification. *Computational Statistics & Data Analysis*, 50, 1090–1104. <http://dx.doi.org/10.1016/j.csda.2004.11.004>.



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