Abstract

Although research supports cognitive behaviour therapy (CBT) as the treatment of choice for childhood obsessive compulsive disorder (OCD) and recommends family involvement (e.g., AACAP, 1998; Barrett, Healey-Farrell, & March, 2004a), little is known about the role of the family in the development, maintenance, and treatment of childhood OCD. Furthermore, although significant improvements are found in treatment response, many children remain symptomatic (de Haan, 2006). **Objective:** The aims of the study were to examine (1) the perceptions of the family environment among family members and if child perceptions change with treatment and (2) treatment response and child and family characteristics that may predict treatment response. Gender differences were also examined. **Method:** This study involved 82 children (ages 8 to 17 years) receiving CBT for OCD and a concurrent parent program. Children and parents were assessed at initial, pre-, and post-treatment with questionnaires, a symptom severity interview, a family environment questionnaire, and child self-report measures of anxiety and depression. Pre-treatment data were used for the prediction of treatment response. **Results:** Child and parent perceptions of the family environment differ in terms of family expressiveness, with children perceiving their family as being ‘distressed.’ Although girls and boys had similar perceptions of their family environment, girls’ perceptions were more in agreement with their parents than boys. Children’s ratings of family cohesiveness were ‘normal’ at pre-treatment, and increased significantly at post-treatment; however, this was not meaningful when gender was considered. We found a similar treatment response to past research. Different characteristics were found to predict treatment response for boys and girls, with more predictors
being identified for girls. **Conclusions:** Results emphasize the importance that families may have in the treatment of OCD and in our attempt to find predictors, as well as the need to examine boys and girls separately. This research is critical to refine and tailor treatment techniques to match child and family characteristics.
Acknowledgements

This project would not have been possible without Dr. Sandra Mendlowitz (Psychologist at the Hospital for Sick Children and Assistant Professor at the University of Toronto). I am thankful for her guidance, support, and expertise throughout this long journey. Much appreciation to Dr. Paul Arnold (Staff Psychiatrist at the Hospital for Sick Children and Assistant Professor at the University of Toronto) and Dr. Xi Chen (Associate Professor at the Ontario Institute for Studies in Education), for their insightful comments on this paper. Many thanks to Dr. Eric Storch (Psychologist and Associate Professor at the University of South Florida) for his participation in my defence. I am incredibly grateful to Olesya Falenchuk for her knowledge and assistance with the statistical analyses. I could not have finished this paper without the support from my family and friends. Finally, a warm thank you goes out to the children and families who participated in this study.
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Introduction

Obsessive compulsive disorder (OCD) is a common and distressing anxiety disorder with prevalence rates of around 1-2% (Mancuso, Faro, Joshi, & Geller, 2010). OCD is characterized by obsessions and/or compulsions that cause impairment and interfere with academics, social activities, and relationships (American Psychiatric Association [APA], 2000). Childhood OCD often impairs both the child and the family (Piacentini, Bergman, Keller, & McCracken, 2003; Storch et al., 2007b); yet, little is known regarding the role of the family in the development and maintenance of childhood OCD (Waters & Barrett, 2000). Research supports cognitive behaviour therapy as the treatment of choice for childhood OCD and recommends family involvement (e.g., AACAP, 1998; Barrett et al., 2004a). Significant improvements are found, as evidenced by mean reductions in OCD symptoms ranging from 45% to 65% (Krebs & Heyman, 2010). Many children, however, do not respond optimally and remain symptomatic after treatment (de Haan, 2006). The literature examining child and family characteristics that predict treatment response in childhood OCD is limited and has produced few consistent findings (Ginsburg, Kingery, Drake, & Grados, 2008). This research is crucial to refine and tailor treatment techniques to match child and family characteristics.

The present study will investigate the perceptions of the family environment among family members and if child perceptions change with treatment. Treatment response and characteristics of the child and family environment that may predict treatment response in a cognitive behavioural therapy (CBT) treatment program for children with OCD will also be examined. Predictor characteristics to be examined include those related to the child (e.g., demographics, aspects of OCD symptoms, comorbidity) and the family environment (e.g., negative interaction styles, accommodation).
Obsessive compulsive disorder

Obsessive Compulsive Disorder (OCD) is an Axis I anxiety disorder, characterized by recurrent obsessions and/or compulsions that cause impairment in terms of marked distress, time consumption (i.e., more than an hour per day), or significant interference with school, social activities, or important relationships (APA, 2000). Obsessions are intrusive, repetitive thoughts, images or impulses. They are generally accompanied by significant negative affect, such as fear, disgust, doubt, or feelings of incompleteness (APA, 2000). Compulsions are purposeful, repetitive behaviours or mental acts (i.e., rituals) performed in an effort to relieve the distress or negative affect associated with the obsessions (APA, 2000). Compulsions can be observable repetitive behaviours, such as washing, or covert mental acts, such as counting. They are negatively reinforced when they reduce the anxiety that is associated with the obsession. This in turn increases the strength of the urge to perform the compulsion the next time the individual has an obsessive thought. Reinforcement also occurs at a cognitive level in that the feared event (i.e., the obsession) does not occur, which confirms a false belief that the ritual (i.e., the compulsion) prevented the harmful consequence (March & Mulle, 1998). Compulsions are associated with a high degree of familial conflict and frustration (Cooper, 1996).

For a child to be diagnosed with OCD, criteria need to be met for either obsessions or compulsions, although the majority have both (Storch et al., 2004). Although the DSM-IV-TR criteria for diagnosing OCD in children and adults are the same, children are not required to have insight into the senselessness or excessive nature of their symptoms (APA, 2000). When someone of any age lacks insight into the senselessness of their obsessions and compulsions, the specifier, “with poor insight” is included as part of the diagnosis (March & Mulle, 1998). Finally, to be clear about the origin of the symptoms, the DSM-IV-TR also requires that the specific content of the obsessions cannot be related to another Axis I diagnosis, such as thoughts
about food resulting from an eating disorder, guilty thoughts (i.e., ruminations) originating from depression, or delusional thought content related to psychosis.

Current epidemiological studies estimate that between 1% and 2% of children are affected by OCD (e.g., Mancuso et al., 2010). It has been suggested that these prevalence rates may be an underestimate because young children are often secretive about their thoughts and behaviours (i.e., especially those with themes of a sexual, aggressive, religious nature), experience developmentally-based difficulty articulating their concerns, and may not present for treatment unless their symptoms are extreme or debilitating (Thomsen, 1994; Vallenii-Basile et al., 1994). A potential difficulty in assessing the prevalence of OCD is the need to distinguish it from the broad range of mild or transient obsessions and compulsions that occur as common experiences in the general population (Maltby & Tolin, 2003) and as normal developmental phenomena that are commonplace in childhood (Wagner, 2003). Among adults with OCD, one third to one half report having developed the disorder during childhood (Pauls, Alsobrook, Goodman, Rasmussen, & Leckman, 1995).

The effects of age and gender on childhood OCD have been studied. Reports of the age of onset vary considerably; some evidence suggests that children as young as three or four years of age may develop the disorder (Turner, 2006). However, the mean age of onset is more typically reported to be around 10.4 years (range 6.9–12.5 years; Chowdhury, Frampton, & Heyman, 2004; Stewart et al., 2004). Studies of children presenting with early-onset OCD (i.e., pre-pubertal onset) note a male preponderance (i.e., 3:2) with the gender distribution becoming more equal in adolescence (Geller et al., 1998). Cases with early onset are also more likely to be familial than those with later onset (Nestadt et al., 2000; Pauls et al., 1995). Adult samples report sex ratios being equal or showing a slight overrepresentation of females (Carter & Pollock, 2000; Geller et al., 2001; Jaisoorya, Reddy, & Srinath, 2003). Although comparative
data are negligible, epidemiological studies do not find significant differences among ethnic
groups in the United States in the prevalence of childhood OCD (Valleni-Basile et al., 1994).

The phenomenology of childhood OCD is understood to be broadly similar to that in
adulthood. With the exception of an infection-related subtype of OCD characterized by a
temporal association with group A streptococcal infections (called pediatric autoimmune
neuropsychiatric disorders associated with streptococcal infections -PANDAS; Murphy, Sajid,
& Goodman, 2006), most cases involve an insidious onset. Some children experience a chronic
course with fluctuating severity, while others experience a more variable course with significant
periods of remission with episodic exacerbation (Bolton, Luckie, & Steinberg, 1995; Leonard,
Swedo, & Lenane, 1993; Thomsen & Mikkelsen, 1995). In a meta-analytic review of 16 studies
(with follow-up periods ranging from 1 to 15.6 years) Stewart et al. (2004) found that 40% of
individuals with child/adolescent-onset OCD no longer met criteria for full or sub-threshold
OCD, suggesting a persistence rate of 60%.

There are a wide variety of obsessions and compulsions with varying degrees of
functional impairment (Markarian et al., 2010). Studies examining symptom types have found
that the most common obsessions in children have themes of contamination, harm to self or
others, symmetry and exactness, while in adolescence, religious and sexual obsessions become
more common (Franklin et al., 1998; Geller et al., 2001; Riddle, Hardin, King, Scahill, &
Woolston, 1990; Swedo et al., 1989). Common compulsions in children include overt
behaviours such as washing, checking, ordering, touching, hoarding, and reassurance seeking
(i.e., verbal checking), and covet behaviours such as repeating words or phrases, reviewing or
cancelling thoughts, silent prayers, or counting (Carter & Pollock, 2000; Franklin et al., 1998;
Geller et al., 2001; Wever & Rey, 1997). Some symptoms are unusual and can be less readily
recognized as OCD, such as obsessions about magically acquiring unwanted characteristics
from others (i.e., “transformation obsessions”; Volz & Heyman, 2007). While adult OCD
symptoms tend to remain highly stable over time (e.g., adults are often classified by their compulsions as “checkers” or “washers”), childhood symptoms tend to vary, with many children endorsing all of the common obsessions and compulsions at some point, and seldom displaying only a single compulsion (Hanna, 1995; Mataix-Cols, Marks, Greist, Kobak, & Baer, 2002; Wever & Rey, 1997).

**Comorbidity.** It is rare for childhood OCD to present as the only disorder in the clinical picture; comorbidity is the rule rather than the exception (Storch et al., 2008b). Although reported rates vary considerably across studies, up to 80% of children with OCD meet criteria for an additional DSM-IV-TR disorder (Storch et al., 2008b), and up to 50% experience multiple comorbid conditions (Wagner, 2003). Differential diagnosis can be difficult, as OCD shares some features (e.g., attention and behavioural difficulties) with other disorders (March, Franklin, Leonard & Foa, 2004). Although research is limited, children with comorbid disorders may experience more significant psychosocial impairment above and beyond the OCD diagnosis (e.g., Masi et al., 2006; Sukhodolsky et al., 2005; Storch et al., 2008b).

The most frequent comorbid diagnoses in children with OCD are major depression (10–73%), anxiety disorders (26–70%), tic disorders (17–59%), disruptive behaviour (10–53%), attention deficit hyperactivity disorder (ADHD; 10–50%), and mania (27%; Geller et al., 2001; Hanna, 1995; Riddle et al., 1990; Swedo et al., 1989).

Among other disorders, rates of anorexia nervosa and bulimia nervosa are elevated among adolescents with OCD (i.e., 2%; Geller et al., 2001). It is important to distinguish individuals with OCD who have restricted eating, driven by a feared consequence unrelated to weight gain (e.g., getting good poisoning or choking) versus a separate eating disorder diagnosis (Krebs & Heyman, 2010). Furthermore, children with OCD are at risk of developing secondary physical problems associated with their compulsions, such as eczema from repeated washing,
lesions from skin picking, and enuresis and encopresis from refusal to void bodily waste (Snider & Swedo, 2000).

**Family environment of a child with obsessive compulsive disorder**

Genetics (i.e., having a parent with OCD or another psychiatric diagnosis; Derisley, Libby, Clark, & Reynolds, 2005), neurological, cognitive and behavioural factors have been proposed to explain the nature and etiology of OCD (see Rasmussen, 1993 for a review). Little is known, however, regarding the role of the family environment (i.e., interaction styles, expressed emotion, accommodation) in the development and/or maintenance of childhood OCD (Waters & Barrett, 2000).

**Family interaction styles and expressed emotion.** Survey and observational research has provided some evidence to suggest that the family environment of children with OCD may be characterized as lacking warmth (Barrett, Shortt, & Healy, 2002; Vallenì-Basile et al., 1995), generally displaying less positive interactions during family interaction tasks (Barrett et al., 2002), and displaying increased expressed emotion (EE; an environment characterized by criticism of, hostility toward, and/or emotionally charged patterns of interaction with a patient with a psychological disorder; Hibbs, Hamburger, & Lenane, 1991; Leonard et al., 1993) compared with other families. Vallenì-Basile et al. (1995), in a preliminary investigation of adolescents’ perceptions of their family environment, investigated the quality of the family milieu and family interactions using a self-report questionnaire. In this study, adolescents diagnosed with OCD reported significantly less emotional support, warmth, and closeness in their family compared to nonclinical controls. This study, however, may be limited due to subjective biases associated with self-report measures.

In a more controlled and reliable observational study, Barrett et al. (2002) compared families with children with OCD, families with other clinically diagnosed children, and families with nonclinical children to see if they differed in the way they behaved during family
interactions. All families were given the task of completing two, five-minute discussions of hypothetical situations designed to evoke a low level of anxiety. Results demonstrated that parent and child behaviours during family interactions were significantly different in families with children with OCD than in comparison families. Specifically, parents of children with OCD demonstrated less confidence in their child’s ability, rewarded independence less often, and used less positive problem solving strategies. Similarly, children in the OCD group were less confident, showed their parents less warmth, and were less likely to use positive problem solving. Because data was collected post-diagnosis, it is not possible to draw conclusions about the direction of causality (Barrett et al., 2002).

One family characteristic that has been associated with OCD is high EE. EE refers to a family environment characterized by criticism of, hostility toward, and/or emotionally charged interaction styles with a patient with a psychological disorder. Although EE has gained increased attention in the study of families of adult patients with OCD (e.g., Chambless & Steketee, 1999; Van Noppen, 1999), research examining EE in the families of children with OCD is limited.

Preliminary research with childhood samples supports the conclusion that high EE is characteristic of families with a child diagnosed with OCD in comparison to children without a diagnosis. For example, Hibbs et al. (1991) examined EE in a study that compared families with children who had: (1) OCD, (2) an externalizing disorder, or (3) no psychiatric disorder. EE was measured on the basis of a parent’s 5-minute description of his or her child. Parents in both the OCD and externalizing disorder groups did not differ and were more frequently rated as high-EE. Leonard et al. (1993) also found that children with OCD living in high EE families had poorer global adjustment at 2 to 7 year follow-up, although EE did not predict OCD symptom severity. Interestingly, Przeworski et al. (1999) found that parents were more likely to have high EE with their children with OCD compared to their children without OCD (i.e., siblings),
suggesting that high EE is more likely to be a reaction to the child’s OCD symptoms rather than a stable attribute of the parents. High EE was also associated with greater severity of symptoms and greater family accommodation.

**Family accommodation.** Children with OCD often involve family members in their OCD symptoms (Storch et al., 2007b). Van Noppen et al. (Van Noppen, Rasmussen, Eisen, & McCartney, 1991; Van Noppen, Steketee, McCorkle, & Pato, 1997) described family behaviour ranging from antagonistic to overly accommodating. Antagonistic family members ‘consistently refuse to condone or involve themselves with the patient’s symptomatic behaviour … [and] tend to be rigid, detached, hostile, critical, and punitive’ (Van Noppen et al., 1991, p. 119). This type of reaction may lead to elevated levels of stress, potentially increasing the frequency and/or severity of the rituals (Steketee, 1993) and also possibly leading individuals to become more secretive about their compulsions and less likely to seek treatment.

In contrast, accommodating family members ‘are usually over-involved, permissive, and intrusive in relating to the patient … and are consistent in joining in and helping with the rituals’ (Van Noppen et al., 1991; p. 118). Accommodation can occur through either direct involvement in the child’s symptoms (e.g., participation in or assistance with rituals, hearing “confessions”, providing reassurance, answering repeated questions, providing required objects), and/or through indirect approaches (e.g., modification in the family routine and behaviour to prevent escalation of symptoms or to reduce child distress; Cooper, 1996; Peris et al., 2008; Storch et al., 2007b; Waters & Barrett, 2000).

Research on accommodation in families with an individual with OCD has been largely descriptive and includes adult samples (Amir, Freshman, & Foa, 2000; Calvocoressi et al., 1999). However, rates of accommodation of symptoms in families of children with OCD has been found to be high (Allsopp & Verduyn, 1990; Cooper, 1996; Storch et al., 2007b), with up to 75% of parents reporting actual participation in their children’s OCD rituals (Allsopp &
Verduyn, 1990; Cooper, 1996). In children, Storch et al. (2007b) reported that greater OCD severity led to increased family accommodation, which in turn resulted in elevated functional impairment.

While the family’s accommodation of symptoms is often a well-intentioned and natural process to engage in, it typically contributes to increased negative family functioning (Steketee & Van Noppen, 2003), increased family stress (Calvocoressi et al., 1995), and plays a role in the maintenance of symptoms (Waters & Barrett, 2000). Accommodation reinforces fear and avoidance behaviours and prevents the child from experiencing the natural habituation of anxiety that results from refraining from engaging in rituals (a primary goal of cognitive-behavioural therapy; Storch et al., 2007b).

**Obsessive compulsive disorder: Treatment**

Without treatment, childhood OCD is associated with significant social, academic, and familial impairment, and tends to persist into adulthood (Storch et al., 2007d). The OCD Expert Consensus Guidelines (March et al., 1997a) and Practice Parameters (American Academy of Child and Adolescent Psychiatry, 1998) recommend Cognitive Behavioural Therapy (CBT) as the first-line treatment of choice for all pre-pubertal children with a primary diagnosis of OCD, and for adolescents with mild or moderate symptoms (i.e., score <19 on the Children’s Yale-Brown Obsessive Compulsive Scale; CY-BOCS; Scahill et al., 1997). A combination of CBT and pharmacological treatment, in the form of Serotonin Reuptake Inhibitors (SRIs) or Selective Serotonin Reuptake Inhibitors (SSRIs) is recommended for adolescents with severe symptoms (see Abramowitz, Whiteside, & Deacon, 2005 for a review).

Cognitive behavioural therapy has some advantages over pharmacological treatment in terms of overall efficacy (Abramowitz et al., 2005), self-efficacy, promoting adaptive coping strategies (Carter & Pollock, 2000), safety, and enduring effects following conclusion of treatment (Barrett, Farrell, Dadds, & Boulter, 2005; Lewin & Piacentini, 2009). Nevertheless,
medication may play a central role in the treatment of patients who have a poor treatment response to CBT, who are unable or unwilling to participate (i.e., in exposure-based tasks, low motivation), with very severe symptom severity and impairment, with comorbid disorders (e.g., oppositional behaviour, severe depression), or in situations where high quality CBT is unavailable (Piacentini & Langley, 2004; Storch et al., 2010a).

Given the dynamic impact families have on the development and maintenance of OCD in children (see above) it is also recommended that family involvement is optimal in the treatment of childhood OCD (e.g., Barrett et al., 2004a). Given these parameters, CBT with family involvement is the treatment of choice.

**Cognitive behavioural therapy.** Generally speaking, CBT for childhood OCD is a time-limited, present-oriented approach to psychotherapy that teaches children (and family members) the cognitive and behavioural competencies needed to adaptively respond to obsessions and compulsions (e.g., Storch et al., 2007c). Treatment involves three main components: exposure (i.e., placing the child in situations that elicit obsessional anxiety); response prevention (i.e., refraining from engaging in compulsions that function to reduce or avoid anxiety); and cognitive therapy (i.e., training the child to identify and reframe anxiety-provoking cognitions; Storch et al., 2010a).

Traditionally, CBT takes place in the context of a 1-hour, in-office therapy session, once a week; however, a variety of factors may be adjusted to best suit the needs of the child (Storch et al., 2007c). CBT represents a joint effort of therapist and patient (which includes the child and family member), who form a collaborative team to address symptoms.

To participate in CBT, children need to be able to think about their own thoughts, consider how those thoughts affect feelings and behaviour, and perform uncomfortable activities (e.g., exposures and response prevention) with a belief that the benefits will outweigh the temporary discomfort of the anxiety (Martin & Thienemann, 2005).
Family-focused interventions that address critical targets, including reducing parental involvement in the child’s OCD symptoms and rituals (i.e., accommodation) and enhancing family education, communication, and problem solving strategies (Barrett et al., 2004a; Piacentini, 1999) are likely to be more effective and associated with long-term maintenance of gains than interventions that target the child as an individual.

**Efficacy.** The efficacy for CBT in childhood OCD consists mainly of case series and open trials (i.e., no control condition) of individual or group format and in the presence or absence of an adjunctive family-based (typically parent) intervention. To date, there have been only 4 controlled trials of CBT (e.g., Barrett et al., 2004a; de Haan, Hoodgum, Buitelaar, & Keijzers, 1998; Pediatric OCD Treatment Study, POTS, 2004; Storch et al., 2007c).

Following is a review of some representative studies that have examined CBT with samples of children with OCD, including individual, family, group, and intensive treatment. Although a thorough review of pharmacological treatment (i.e., medication) is beyond the scope of this paper (see Geller et al., 2003 for a review), three studies that have directly compared medication with CBT will be discussed. A brief summary of these and additional studies (i.e., both open and controlled trials) describing sample characteristics, treatment components, results obtained, and strengths and limitations is provided in Table 1.

**Individual treatment.** CBT has been demonstrated to show significant improvement for children when delivered individually (e.g., Barrett et al., 2004a; Franklin et al., 1998; Piacentini, Bergman, Jacobs, McCracken, & Kretchman, 2002; POTS, 2004; Scabill, Vitulano, Brenner, Lynch, & King, 1996). In one of the first open trials of manualized CBT for children with OCD, March, Mulle, & Herbel (1994) evaluated a structured CBT protocol with fifteen children. Results indicated significant pre-to post-treatment improvement in OCD symptoms for the sample, with a mean reduction in symptom severity (on the CY-BOCS) of about 50%. There
was no indication of relapse at follow-up assessment and booster treatment enabled six participants to discontinue medication with minimal to no return of symptoms.

Scahill et al. (1996) reported similar findings treating seven children with CBT. Results indicated a significant mean reduction in symptom severity of 61% (on the CY-BOCS) at post-treatment. Gains were maintained at 3-month follow-up, and booster sessions were effective in preventing relapse in the majority of participants. Although this study did not have a control group, three children who met criteria for OCD but elected not to receive the treatment showed no improvement in their symptoms.

**Family treatment.** Family-based CBT in children has shown promising results (e.g., Barrett et al., 2004a; Franklin et al., 1998; Knox, Albano, & Barlow, 1996; March & Mulle, 1998, Thienemann, Martin, Cregger, Thompson, & Dyer-Friedman, 2001). For example, Waters, Barrett, and March (2001) provided pilot data on the efficacy of a 14-week individual CBT treatment protocol for seven children that included a structured weekly parent skills training component. Treatment included components on education, parental participation in childhood relaxation training, reduction of accommodation, parental anxiety management, family support of ERP, and problem solving skills training. Results indicated that six of the seven participants were “diagnosis free” at post-treatment, with a mean reduction of 60% (on the CY-BOCS). These results were maintained to 3-month follow-up. Family accommodation also improved significantly from pre-to post-treatment. This highlights the importance of involving the family in the treatment of OCD.

Overall, the findings support family involvement in CBT as a valid treatment for childhood OCD. However, the often open-ended and flexible nature of this involvement has prevented rigorous examination of what components contribute to treatment (Barrett et al., 2005). Further research is needed to systematically investigate whether CBT, with the addition
of a family component, improves effectiveness in the short- and long-term for children with OCD.

*Group treatment.* Group CBT holds promise in terms of cost-effectiveness, efficient use of skilled CBT therapists, and potential clinical advantages of the group milieu such as destigmatization, support, and motivation (Himle, Van Etten, & Fischer, 2003b). Fischer, Himle, and Hanna, (1998) published the first naturalistic study on group CBT with 15 children and adolescents. Treatment consisted of a relatively brief 7-week group intervention, with an additional eighth group session involving parents. Results indicated that 58% of the sample improved by at least 30% (on the CY-BOCS) at post-treatment, and 80% met “improvement criteria” at the 6-month follow-up.

Thienemann et al. (2001) completed a naturalistic open trial for adolescents with OCD similar to the Fischer et al. (1998) study; however, it varied in terms of length. They treated 18 adolescents using a protocol that involved 14 weekly sessions of group CBT with 15 minutes of parental participation incorporated into each session. Results indicated that OCD symptoms decreased significantly from pre-to post-treatment, with 50% of the sample meeting “improvement criteria” of 25% or more (on the CY-BOCS) and small reductions in anxiety (as measured by the Multidimensional Anxiety Scale for Children, MASC; March, 1997), and depression (as measured by the Children’s Depression Inventory; CDI; Kovacs, 1992). Of note, medication changes during the group CBT trial may have confounded results, and maintenance of gains is unknown, as post-treatment assessment results were not reported. Anecdotally, these adolescents commented that they valued the opportunity to share like problems with their peers.

Martin and Thienemann (2005) evaluated a group CBT protocol with a younger child sample. Children and their parents met concurrently in separate groups, for 14 weekly sessions of group CBT, in a format used by Mendlowitz et al. (1999). Results indicated a substantial reduction of 25% in OCD symptoms (on the CY-BOCS). In addition, parents reported a
significant decrease in OCD-related functional impairment at post-treatment, consistent with other studies such as the one by Piacentini et al., 2003.

Barrett et al. (2004a), in contrast to the above studies, conducted a randomized controlled trial of cognitive-behavioural family treatment (CBFT) for 77 children with OCD. This study investigated the relative efficacy of (a) individual CBFT; (b) group CBFT; and (c) a waitlist control group. Children were assessed before and after treatment and at 3- and 6-months following the completion of treatment. Treatment involved a 14-week manualized CBT protocol with parental and sibling components including psychoeducation, anxiety management, and skills training around family involvement in the child’s OCD behaviours. Results indicated a 65% mean reduction in OCD symptoms for individual and a 61% mean reduction in OCD symptoms for group CBFT (as measured on the CY-BOCS), with no significant difference across conditions. In addition, 88% of youth involved in the individual condition were “diagnosis-free” at the completion of treatment, as were 76% of participants in the group condition. Both treatment conditions demonstrated improvement over the waitlist control, in which there was no significant change in symptoms, although the relatively short duration of the waitlist condition (4-6 weeks) potentially limits the utility of comparisons between the active and no-treatment groups. Results were maintained at 3- and 6-month follow-ups. Barrett et al. (2005) reported that treatment gains were maintained at 18-month follow-up.

These results support the efficacy and durability of group CBT in reducing childhood OCD symptoms (e.g., Barrett et al., 2004a; Fischer et al., 1998; Himle et al., 2003b; Martin & Thienemann, 2005; Thienemann et al., 2001); however, the improvements found in group CBT are slightly less robust than those in individual CBT (Barrett et al., 2005). Shortcomings of the group approach may include the practical challenge of assembling groups, difficulties with group heterogeneity, and the possible reluctance of some group candidates to share symptom
details (Himle et al., 2003b). There continues to be a need for additional research in the area of group CBT for childhood OCD.

**Pharmacological treatment.** In the very first controlled trial of CBT for childhood, de Haan et al. (1998) randomly assigned 22 children to CBT (with exposure and response prevention and not a large cognitive component) or medication (i.e., clomipramine) in a parallel treatment lasting 12 weeks. Treatment response was defined as a 30% or greater reduction in OCD symptoms (on the CY-BOCS). Results indicated that both CBT and medication led to significant improvement at post-treatment; however, CBT was found to be superior to medication both in terms of response rates (66.7% versus 50%) and in symptom severity reduction (59.9% vs. 33.4%). Although constrained by small sample size, these findings support the use of CBT as a frontline treatment for children with OCD and to its potential benefit over pharmacological treatment.

Asbahr et al. (2005) compared group CBT (GCBT; see Barrett et al., 2004a for format) to medication (i.e., sertraline) in 40 children with OCD. Consistent with de Haan et al. (1998), participants in both the GCBT and medication conditions demonstrated significant improvement (on the CY-BOCS) at post-treatment. However, at 9-month follow-up, children in the GCBT condition reported significantly lower rates of symptoms compared to youth treated with medication. This provides further support in demonstrating the efficacy of GCBT and for the potential long-term superiority of psychosocial (i.e., CBT) versus pharmacological approaches in treating childhood OCD.

The clearest evidence to date of which treatment approaches work best for treating childhood OCD comes from the Pediatric OCD Treatment Study (POTS, 2004). This multi-site, randomized control, clinical trial assigned 112 children (ages 7 to 17) to one of four treatment conditions: CBT alone, sertraline alone (i.e., a SSRI medication), combined treatment (i.e., CBT + sertraline), or a control condition (i.e., a pill placebo). The CBT protocol included 14
treatment sessions conducted over 12 weeks involving 3 parent sessions. Results indicated that all active treatments were significantly superior to the placebo condition at post-treatment in reducing OCD symptoms (on the CY-BOCS). Combined treatment proved to be superior to either CBT or medication alone, which did not differ from one another. However, an examination of “excellent responders” (as measured by a CY-BOCS total raw score of less than or equal to 10) revealed a significant advantage for the two CBT conditions, with the following response rates emerging: combination, 54%; CBT only, 39%; SSRI only, 21%; placebo, 3%.

**Intensive treatment.** Not all patients respond to traditional, weekly sessions of CBT. An alternative for such cases is intensive CBT. Intensive treatment incorporates identical principles to standard weekly CBT; however, children undergo a concentrated course of therapy over 2 to 4 weeks, which is characterized by an intensive and focused targeting of symptoms. Two studies (Franklin et al., 1998; Storch et al., 2007c) examined intensive CBT delivered with different dose intensities. Franklin et al. (1998) compared weekly CBT (mean number of sessions = 16) with intensive CBT (18 sessions over one month) with 14 children. There were no significant differences in responses between groups. Following treatment, there was a mean reduction of 67% in OCD symptoms across groups (on the CY-BOCS), with 12 of the 14 children showing at least 50% improvement. Treatment gains in both conditions were maintained at 9-month follow-up.

More recently, Storch et al. (2007c) compared the efficacy of weekly (i.e., 14 weeks) versus intensive (i.e., 14 sessions over 3 weeks) individual, family-based CBT for 40 children. Both treatments utilized a treatment manual by Lewin et al. (2005) with modifications designed to allow for greater parental psychoeducation and to facilitate parental coaching during homework exercises. Despite a blinded randomization procedure, the intensive treatment group was significantly younger and had more severe OCD than the weekly treatment group. Following treatment, “remission” (defined as a CY-BOCS total raw score of 10 or less) was
achieved for 75% of children in the intensive group and 50% in the weekly group. Both groups evidenced a significant improvement in psychosocial functioning and a significant decrease, although more so in the intensive versus weekly condition, in family accommodation of OCD symptoms. Although these findings suggest an initial advantage of intensive treatment over weekly treatment, the two treatment conditions were similar at 3-month follow-up.

**Summary.** While there is some variability, the studies above (as well as those summarized in Table 1) support CBT for the treatment childhood OCD. Significant improvements are found, as evidenced by mean reductions in OCD symptoms (on CY-BOCS scores from pre- to post-treatment) within the range of 45% to 65% (results from open and controlled trials; Krebs & Heyman, 2010). It is important to note, however, that there are no consistent guidelines used to define and measure treatment response and/or remission (Turner, 2005; Storch et al., 2010b). For example, treatment response has been defined as having reductions to a certain threshold in OCD symptoms on the CY-BOCS ranging from 25-30% (Himle et al., 2003b; Martin & Thienemann, 2005; Thienemann et al., 2001) to 50% or greater (Benazon et al., 2002; Franklin et al., 1998; March et al., 1994; Valderhaug, Larsson, Gunnar, & Piacentini, 2007). Treatment response has also been measured with “remission rates” defined as a “patient who no longer meets criteria for OCD and has no more than minimal symptoms” (Frank et al., 1991). For example, the Pediatric OCD Treatment Study (POTS, 2004) used a post-treatment score of 10 on the CY-BOCS to define remission whereas Freeman et al. (2008) used a score of 12. Generally, remission rates of the disorder have been found to range from 40% to 85% across studies (e.g., Barrett et al., 2004a; Benazon et al., 2002; POTS, 2004; Waters et al., 2001). A limitation is that some of these trials report results for combined treatment (i.e., CBT + medication); however comparable results are reported in evaluations of CBT alone (e.g., Benazon et al., 2002), and trials comparing CBT with medication (e.g., de Haan et al., 1998; POTS, 2004). As well, a number of studies contain methodological
limitations such as small sample sizes, treatment response confounded by the presence of concurrent pharmacotherapy, and lack of randomly assigned control groups. Other studies have employed different criteria altogether to determine treatment response. For example, the Clinical Global Impression-Improvement (CGI-I; Guy, 1976), a clinician-rated estimate of improvement and the Anxiety Disorder Interview Schedule (ADIS; Silverman & Albano, 1996) are commonly used to assess treatment response. Some studies also use multiple criteria to measure treatment response (e.g., decrease or cut-off score on the CY-BOCS and CGI-I; March et al., 1998).

Treatment gains have been shown to be maintained for a number of months post-treatment, ranging from 3 months (Scahill et al., 1996) to at least 18 months (Barrett et al., 2005; March et al., 1994; O’Leary, Barrett, & Fjermestad, 2009). However, a number of methodological flaws (e.g., not blindly assessed) in the undertaking of follow-up assessments raises questions about the validity of the findings (Barrett et al., 2005). As a result, there is still a great need to continue assessing durability effects.

**Predictors of treatment response**

Although research indicates that CBT is effective for treating childhood OCD, many children do not respond optimally and remain symptomatic (de Haan, 2006). This suggests that treatment for childhood OCD has room for improvement and that certain characteristics may predict treatment response.

The identification of characteristics that predict treatment response to CBT in childhood OCD is critical to refine and tailor techniques to match child and family characteristics. Given that approximately 80% of adults with OCD exhibit initial symptom onset prior to 18 years of age (Riddle, 1998; Pauls et al., 1995), the identification of predictors of treatment response seems critical to help children overcome OCD symptoms before they become chronic and debilitating in nature.
To date, the literature examining characteristics that predict treatment response to CBT in childhood OCD is extremely limited, lagging behind the modest data on adult predictors (Storch et al., 2007d). Studies that have included an examination of predictors of CBT treatment response in childhood often parallel findings from the adult literature (Keeley, Storch, Merlo, & Geffken, 2008). In the following section, characteristics that may influence treatment response are reviewed, including child and family environment characteristics. Characteristics related to the child include: demographics (e.g., gender, age, SES, medication status), aspects of OCD symptoms (i.e., age of OCD onset, illness duration, previous intervention for OCD, symptom severity, symptom presentation), and comorbidity (e.g., externalizing and internalizing disorders). The family environment is likely an important predictor of treatment response in the treatment of OCD (Piacentini et al., 2003; Piacentini, Peris, Bergman, Chang, & Jaffer, 2007; Valderhaug & Ivarsson, 2005); however, almost without exception, it has not been studied in childhood OCD. Characteristics that may be related to the family environment include: negative interaction styles, accommodation, parental involvement in treatment, and parental psychopathology. Cognitive influences (i.e., treatment expectancy, motivation, insight) and treatment-specific characteristics (i.e., therapeutic alliance, compliance) will not be reviewed in this paper (see Keeley et al., 2008 for a review), as they have not been examined as predictors of treatment response in children. The current review includes studies that vary with regard to the construct used to assess treatment response, with some studies utilizing dichotomous constructs (e.g., treatment responder/non-responder) and other studies utilizing more continuous constructs (e.g., change in CY-BOCS scores across treatment).

**Child characteristics.**

**Demographics.** A small number of demographic characteristics have been explored as predictors of treatment response in CBT for OCD across both adult and child studies. Currently, there is inconsistent evidence to suggest gender as a predictor of treatment response. Four adult
studies have demonstrated that gender is not correlated to treatment response (i.e., Benazon et al., 2002; McLean et al., 2001; Moritz et al., 2004; & Piacentini et al., 2002). Foa et al. (1983), however, reported a tendency for male gender (in adults) to be predictive of better treatment response. In studies involving children, Piacentini et al. (2002) and Valderhaug et al. (2007) did not find a relationship between gender and treatment response. Adult studies have reported gender differences in comorbidity rates (e.g., Lochner et al., 2004) and symptom presentation (e.g., Castle, Deale, & Marks, 1995; Zohar, Gross- Isseroff, Hermesh, & Weizman, 1999); thus, suggesting the need for future studies to evaluate gender as a moderating variable (Keeley et al., 2008).

Four adult studies have demonstrated that age is not predictive of treatment response (i.e., Franklin, Abramowitz, Kozak, Levitt, & Foa, 2000; Hoogduin & Duivenvoorden, 1988; McLean et al., 2001; Moritz et al., 2004). One exception is a study by Foa et al. (1983), who found that younger age was predictive of better response at post-treatment and follow-up. In studies involving children, age has not been found to be a significant predictor of treatment response (e.g., Barrett et al., 2004a, Piacentini et al., 2002; Valderhaug et al., 2007). This finding may be explained by the clinician’s competence in adapting CBT treatment to the developmental level of the individual (Keeley et al., 2008). In the future, more sophisticated measures of development other than age may help further understand its relationship to treatment response.

In adults, findings suggest that social, occupational, and financial stability is associated with better treatment response (Keeley et al., 2008). However, it may be that such stability is not a predictor of better treatment response per se, but rather a reflection of the degree of impact that an individual’s level of symptom severity is having on different domains of functioning. Research on parental socio-economic status (SES, i.e., educational level, employment status, income level) and marital status has not been investigated as a predictor of treatment response in
childhood OCD. Finally, medication status before the commencement of CBT has not been found to be related to treatment response in children (e.g., Barrett et al., 2004a; Franklin, 1998; Piacentini et al., 2002).

Together, these studies suggest that gender, age, SES, and medication status do not seem to be related to treatment response in CBT for childhood OCD.

**Aspects of OCD symptoms.** In adults with OCD, there have been mixed findings regarding age of OCD onset and illness duration on treatment response (e.g., Visser, Hoekstra, Emmelkamp, 1992; Foa et al., 1983; McLean et al., 2001; Hoogduin & Duivenvoorden, 1988; Moritz et al., 2004). For example, Visser et al. (1992) and Foa et al. (1983) demonstrated a relation between earlier age of OCD onset and better treatment response at long-term follow-up. As well, adults with a shorter illness duration were found to have better treatment response (Keijsers, Hoogduin, & Schaap, 1994) and be more likely to exhibit full symptom remission at seven-year follow-up (Rufer et al., 2005). In studies involving children, Stewart et al. (2004) analyzed long-term data from 16 studies and found that earlier age of OCD onset and longer illness duration predicted worse treatment response.

In adults, Buchanan, Meng, and Marks (1996) found that no prior treatment history was related to better treatment response. Whether an individual has had previous intervention for OCD has rarely been investigated in children; however, a study by Nakatani, Mataix-Cols, Micali, Turner, & Heyman (2009) found that a past history of treatment with CBT was associated with poorer outcome.

With adults, some studies have not found a significant relation between symptom severity and treatment response (e.g., Foa et al., 1983; Hoogduin & Duivenvoorden, 1988; Rufer, Fricke, Moritz, Kloss, & Hand, 2006), whereas other studies have found that greater symptom severity predicted worse treatment response (e.g., Franklin et al., 2000; Keijsers et al., 1994; Mataix-Cols et al., 2002). In children, it appears that more severe symptoms may predict a
worse treatment response (e.g., Garcia et al., 2010). In an open trial of CBT with 42 children (52% receiving medication), Piacentini et al. (2002) reported that more severe obsessions (on the CY-BOCS) predicted worse treatment response. Similarly, Barrett et al. (2005), in their 18-month follow-up of 48 children enrolled in a randomized control trial of CBT (individual vs. family), demonstrated that more severe obsessions and compulsions (on the CY-BOCS) predicted worse treatment response. Stewart et al. (2004) also found that a predictor of greater OCD severity at long-term follow-up included greater OCD severity at pre-treatment. Of note, the majority of pharmacological treatment trials that have examined symptom severity have found that it is not predictive of treatment response (Ginsburg et al., 2008). Although it is unclear at this point whether children with more-severe OCD symptoms do less well in the current CBT programs, it is suggested that symptom severity be taken into consideration when selecting treatment, developing treatment goals, and determining prognosis (Ginsburg et al., 2008). The National Institute for Health and Clinical Excellence guidelines (Nice; 2005), for example, suggest that individuals with severe functional impairment should be offered combined CBT and pharmacological treatment (i.e., SSRI). As well, children with severe OCD may benefit from a greater number and/or higher frequency of CBT sessions (e.g., Barrett et al., 2005).

The symptom presentation of OCD is diverse, with varying degrees of functional impairment and treatment response (Markarian et al., 2010; Storch et al., 2010b). In light of this, researchers have questioned whether symptom predominance is related to treatment response (Storch et al., 2010a). Results from adult studies have found hoarding symptoms predict worse treatment response (e.g., Mataix-Cols et al., 2002; Rufer et al., 2006; Sookman, Abramowitz, Calamari, Wilhelm, & McKay, 2005). This significant relationship may be explained by the finding that hoarders display poor insight, low motivation to change, and a passive resistance to treatment and are more likely to prematurely discontinue treatment (Mataix-Cols et al., 2002).
Sexual/religious concerns in adults have also been associated with worse treatment response (e.g., Alonso et al., 2001; Mataix-Cols et al., 2002; Rufer et al., 2006). Mental rituals or purely obsessional symptoms (and no compulsions) have also been identified as a predictor of worse treatment response to CBT (Alonso et al., 2001; Mataix-Cols et al., 2002) because they are not always recognized, are covert (i.e., they can be used to mitigate heightened anxiety without the knowledge of others), and are difficult to prevent (Storch et al., 2007d). The presence of checking and washing compulsions in adults have been found to be predictive of better treatment response (e.g., Mataix-Cols et al., 2002).

Relatively little has been reported on how CBT treatment response differs as a function of symptom presentation in childhood OCD since most treatment trials do not examine symptom subtype (Ginsburg et al., 2008). In children, it is suggested that predictors of good treatment response include the presence of overt (as opposed to covert) rituals and compulsions (AACAP, 1998). CBT appears less effective in children with purely obsessional symptoms than children who also have compulsions (AACAP; 1998). Storch et al. (2008a) examined how symptoms on the CY-BOCS checklist were associated with treatment response in 92 children with OCD. Findings indicated that those with aggressive/checking symptoms exhibited better treatment response relative to those without. Of note, in a naturalistic study of children treated with pharmacotherapy (i.e., SSRI medication), children with hoarding symptoms were found to be less responsive to medication than those with washing symptoms, despite the fact that the latter had significantly higher levels of functional impairment at baseline (Masi et al., 2005).

Thus, these studies suggest that more work is needed to draw conclusions about the relationship between age of OCD onset, illness duration, previous intervention for OCD, symptom severity, and symptom presentation and treatment response.

**Comorbidity.** Relatively little empirical attention has been paid to how comorbidity in childhood OCD may impact treatment response (March et al., 2007; Storch et al., 2008b).
Among adults, preliminary evidence suggests a relation between higher rates of comorbid depression and worse treatment response (e.g., Abramowitz & Foa, 2000; Abramowitz, Franklin, Street, Kozak, & Foa, 2000; Steketee, Chambless, & Tran, 2001). Certain comorbid personality disorders have been shown to predict worse treatment response, with the most consistent support for the schizotypal personality traits (Keeley et al., 2008). Comorbid anxiety disorders (Storch et al., 2010a) and tic disorders (Whittal, Thordarson, & McLean, 2005) have not been shown to have a relationship to treatment response in adults (Storch et al., 2010a).

There are limited studies examining comorbidity as a predictor of treatment response in children with OCD. Theoretically, comorbid disorders may complicate the treatment of OCD in children by negatively impacting the child’s level of focus, treatment motivation, and compliance (Piacentini, March, & Franklin, 2006). Comorbid conditions may affect treatment response by forcing the clinician to focus on both the primary and comorbid conditions, thus reducing the amount of time spent on OCD treatment-related tasks (Storch et al., 2008b).

There is some evidence to suggest that children with comorbid externalizing disorders have a worse treatment response (March et al., 1997a; March & Curry, 1998; Rappoport, Leonard, Swedo, & Lenane, 1993; Storch et al., 2008b). Children with externalizing behaviour may be less likely to actively participate in sessions (e.g., engage in exposures), establish rapport with the therapist, or complete homework assignments (Storch et al., 2008b). Furthermore, these children may have increased secondary gains from their symptoms (i.e., missing school, decreased role expectations), which serve to maintain the OCD symptoms (Storch et al., 2010a). Working with children with externalizing behaviours may require well-structured and planned CBT sessions, shorter sessions, breaks, contingency management strategies, and/or augmented parent-training to enhance on-task behaviour (Lewin & Piacentini, 2010).
Children with attention problems, such as comorbid ADHD, may become distracted during therapy, have difficulty attending to concepts, forget to complete assignments, and have difficulty delaying gratification (Rapee, 2003). Furthermore, deficits in executive functioning, which are common in these children, are necessary to independently plan and implement exposures and other therapeutic tasks (e.g., engage in thought challenging; Olley, Malhi, & Sachdev, 2007). The presence of ADHD and disruptive behaviour disorders was found to be related to worse treatment response in children receiving 14 sessions of family-based CBT \( (n = 96) \), and disruptive behaviour disorders were related to lower remission rates (Storch et al., 2008b). The presence of a comorbid tic disorder in children with OCD has not been found to be predictive of treatment response in CBT studies (March et al., 2007; Piacentini et al., 2002; Himle, Fischer, Van Etten, Janeck, & Hanna, 2003a). Of note, children with OCD and comorbid externalizing disorders have been found to have poorer response to pharmacotherapy (i.e., SSRI medication) than individuals without externalizing disorders (e.g., Geller et al., 2003).

It is not known whether higher levels of internalizing symptoms or disorders in children (e.g., anxiety, depression) predict a worse treatment response to CBT (Ginsburg et al., 2008). Researchers have suggested that children with depressive disorders may feel less optimistic about treatment success and/or lack the motivation to engage in exposures (Keeley et al., 2008). Severe depression may necessitate prerequisite therapy and/or pharmacotherapy (e.g., to bolster energy, motivation, and reduce irritability; Lewin & Piacentini, 2010). There is some evidence that children with comorbid major depressive disorder or bipolar disorder are less likely to achieve remission with CBT for OCD (Masi et al., 2005; Storch et al., 2008a). Piacentini et al. (2002) found that higher levels of child anxiety symptoms were significantly associated with worse treatment response. Conversely, Barrett et al. (2005) did not find that pre-treatment levels of anxiety or depression predicted treatment response. Storch et al. (2008a) found that a
comorbid anxiety disorder did not predict treatment response; however, the presence of more than one comorbid disorder predicted worse treatment response.

Thus, findings regarding the effects of comorbid disorders on treatment response for childhood OCD are inconclusive. The expert consensus guidelines for OCD (March et al., 1997a) recommend augmenting CBT for multiple comorbid conditions. This may ameliorate some of the negative effects that comorbid symptoms have on treatment response (Storch et al., 2010a).

**Family environment characteristics.**

Researchers have begun to examine characteristics of the family environment, such as negative interaction styles, and how they might influence treatment response (Renshaw, Steketee, & Chambless, 2005). In the adult literature, the construct of expressed emotion (EE; a critical, hostile, or emotionally charged interaction styles) has been found to be a predictor of a poorer response to CBT (e.g., Abramowitz & Foa, 2000; Chambless & Steketee, 1999; de Haan et al., 1997; Foa et al., 1999). For example, Steketee (1993) reported that poor perceived family functioning and household interactions characterized by anger and criticism predicted worse treatment response. Likewise, Chambless and Steketee (1999) found that higher perceived family criticism and hostility were predictive of worse treatment response. This construct has not been studied in the child population.

Among child studies, Piacentini, Gitow, Jaffer, Graae, and Whitaker (1994) demonstrated children with OCD from families with high levels of conflict and poorer social functioning had a worse treatment response than families with lower conflict and better social functioning. In a more recent randomized control trial, Barrett et al. (2005) found that higher levels of family dysfunction predicted worse treatment response. High levels of family conflict, criticism, and stress may interfere with the alliances, trust, and confidence that are favourable to good treatment response (Wagner, 2003). Direct focus on negative family interaction styles
within CBT for childhood OCD may facilitate better responses for those patients who are attempting to cope with hostile and critical family members (Keeley et al., 2008).

Family accommodation to OCD symptoms may be related to worse treatment response (e.g., Ginsburg et al., 2010; Renshaw et al., 2005). In adults, Amir et al. (2000) reported that greater family accommodation and modification of routine at pre-treatment correlated with more severe OCD symptoms at post-treatment. In children, relatively little empirical attention has been directed to family accommodation and treatment response. Storch et al. (2007b) found family accommodation contributes to the relation between child OCD symptom severity and parent-rated functional impairment at post-treatment. More recently, Merlo, Lehmkuhl, Geffken, & Storch (2009) found that reductions in family accommodation during treatment predicted better treatment response.

Despite the fact that involving parents in the treatment of childhood OCD is recommended by several researchers (e.g., Barrett et al., 2004a; Storch et al., 2007c), and may help reduce negative family interactions and accommodation, relatively little attention has been directed to the predictive value of parent involvement in the treatment of OCD. Barrett et al. (2004a) reported greater OCD symptom reduction in children whose families were centrally involved in treatment (with specific attention on accommodation) than families who were not. Knox et al. (1996) found that 4 children did not show a response to treatment until parents were incorporated into therapy sessions.

Children are also vulnerable to other family influences over which they have little control, such as parental psychopathology (Storch et al., 2007d). Bolton et al. (1995) found no relation between parent’s psychological maladjustment and long-term treatment response of adolescents with OCD. Stewart et al. (2004) analyzed long-term data from 16 studies and found that predictors of worse treatment response included any family psychiatric history. Because OCD, particularly with onset in childhood, has been found to have a strong genetic component
(Pauls & Alsobrook, 1999), many children with OCD have a parent with OCD or other anxiety disorders. These parents may be sceptical about CBT and may inadvertently undermine the treatment (Wagner, 2003), unless they have been successfully treated with CBT themselves. They may also reinforce their child’s fears or rituals and contribute to their child’s avoidance of feared stimuli (Piacentini et al., 2006).

Thus, the research on family environment characteristics (e.g., negative interaction styles, accommodation, parental involvement in treatment, parental psychopathology) and treatment response is limited and in need of additional study. Given the impact families have on children, the family environment should be taken into account when treating children with OCD to ensure optimal treatment response.

Summary of predictors

In summary, the literature examining predictors of treatment response in childhood OCD is limited and has produced few consistent findings. In light of this, data suggests that gender, age, and comorbid tics are not associated with treatment response (Ginsburg et al., 2008). In contrast, children with more severe symptoms at baseline seem to show poorer response to treatment. Data with respect to internalizing disorders are mixed. Finally, in the only study to examine family environment, the more negative family interaction styles predicted worse treatment response at 18-month post-treatment follow-up (Barrett et al., 2005).

The research on predictors of treatment response in other childhood anxiety disorders is equally limited and findings have been inconclusive or not associated with treatment response. In terms of gender, if differences in treatment response were found, they appeared to interact with family involvement and parental psychopathology. That is, girls appeared to do better than boys when CBT had a family/parent component (versus no family treatment component; e.g., Cobham, Dadds, & Spence, 1998; Mendelowitz et al., 1999). In terms of age, one study found no difference (e.g., Silverman et al., 1999) while others reported that children younger than 13 were
found to have better treatment response than older children (Barrett, Dadds, & Rapee, 1996; Berman, Weems, Silverman, & Kurtines, 2000). A number of studies have shown that children with more severe symptoms at pre-treatment had a worse treatment response at post-treatment (e.g., Berman et al., 2000; Manassis, Avery, Butalia, & Mendlowitz, 2004; Southham-Gerow, Kendall, & Weersing, 2001). Treatment response has not been shown to differ as a function of comorbidity in children with anxiety disorders (e.g., Silverman et al., 1999). Research on family characteristics as predictors of treatment response in children with anxiety disorders is limited. Higher pre-treatment levels of family cohesion (i.e., defined as emotional bonding of family members) has been found to be associated with a greater decrease in child anxiety at post-treatment for children treated with group CBT (Victor, Bernat, Bernstein, & Layne, 2006). Some studies have shown that parental psychopathology is related to poor treatment response in children with anxiety disorders (e.g., Berman et al., 2000; Southam-Gerow et al., 2001), whereas other studies have not (e.g., Crawford & Manassis, 2001).

Clearly, more research is needed to determine the characteristics related to treatment response in childhood OCD. Clinical trials with larger sample sizes will allow for a more powerful analysis of characteristics on treatment response. More research in this area is needed to refine and tailor treatment techniques to match child and family characteristics.

**Research questions**

**Preliminary research analyses.** Although little is known regarding the role of the family in the development and maintenance of childhood OCD (Waters & Barrett, 2000), family involvement is recommended in treating children with OCD (e.g., AACAP, 1998). The current study involved parents in the treatment of children with OCD, and given the limited research in this area, the following research questions are posed:

**Question 1:** Do the perceptions of family environment differ among family members? Are there differences between boys and girls?
Question 2: Do child perceptions of family environment change with treatment? Are there differences between boys and girls?

**Main research analyses.** Research indicates that CBT is effective for treating childhood OCD. Although there are no consistent criteria to define and measure treatment response, significant improvements have been found in mean reductions in OCD symptoms. However, many children do not respond optimally and remain symptomatic after treatment (de Haan, 2006). This suggests that treatment has room for improvement and that certain child and family characteristics may predict treatment response. The literature on predictors of treatment response, however, is extremely limited and has produced few consistent findings. It is crucial for more research in this area to refine and tailor treatment techniques to match child and family characteristics.

The current study examines treatment response and child and family characteristics that may predict treatment response. The following questions are posed:

**Question 1:** What is the treatment response? Does the child’s total CY-BOCS score change from pre-to post-treatment? Are there differences between boys and girls?

**Question 2:** Which child and family characteristics predict treatment response? Are there differences between boys and girls?
Table 1
*Characteristics of Cognitive Behavioural Treatment Studies for Childhood Obsessive Compulsive Disorder*

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Treatment (s)</th>
<th>Results</th>
<th>Strengths (+) and limitations (-)</th>
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<td><strong>Controlled Trials</strong></td>
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<td>de Haan et al., 1998</td>
<td>-n = 22, 8-18 yrs</td>
<td>-ICBT: 12 weekly sessions (length not reported; n = 12)</td>
<td>-59.9% mean CY-BOCS reduction in ICBT condition</td>
<td>+ manualized protocol + sample eligibility characterized + first published study comparing CBT to SSRI in children with OCD - no control group - no f/u</td>
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<td>(M = 13.3), 50% female</td>
<td>-SSRI: 12 weeks (n = 10)</td>
<td>-33.4% mean CY-BOCS reduction in SSRI condition</td>
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<td>-family involvement: NR</td>
<td>-ICBT &gt; SSRI on CY-BOCS</td>
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<td>-5/9 “non-responders” (defined as &lt;30% CY-BOCS change)</td>
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<td>-effect size: CY-BOCS&lt;sub&gt;PRE-POST&lt;/sub&gt; ICBT = 1.58; SSRI = 1.45</td>
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<td>POTS, (2004)</td>
<td>-n = 112, 7-17 yrs</td>
<td>-12 weeks for all trts</td>
<td>-% mean CY-BOCS reduction at post-trt: 46% for CBT, 29% SSRI, 53% combined, 14.6% placebo</td>
<td>+ manualized protocol + sample eligibility characterized + largest controlled trial to date + multi-center trt delivery + compared CBT to SSRI and their combination - no non-pill placebo or control group - no f/u</td>
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<td>(M = 11.4), 50% female</td>
<td>-CBT: 14, 1 hour sessions over 12 weeks plus 10 x 10 min between session telephone calls</td>
<td>-all three active trt conditions &gt; placebo</td>
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<td>for ADHD</td>
<td>-CBT, SSRI, SSRI, CBT + SSRI, placebo (n = 30 in each condition)</td>
<td>-CBT plus SSRI &gt; CBT and SSRI alone</td>
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<td>-family involvement: 3 dedicated parent sessions: weeks 1, 7, 11; therapists flexible to additional involvement</td>
<td>-CBT and SSRI did not differ</td>
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<td>-OCD remission/ “excellent responders” defined as CY-BOCS score &lt;11; combined 53.6%, CBT 39.3%, SSRI 21.4%, placebo 3.6%</td>
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<td>-examination of “excellent responders” revealed slight advantage for CBT over SSRI</td>
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<td>-significant cross-site differences, whereby CBT superior condition in 1 cite</td>
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<td>-effect size CY-BOCS&lt;sub&gt;PRE-POST&lt;/sub&gt; combined = 1.4, CBT = 0.97, SSRI= 0.67</td>
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<tr>
<td>Barrett et al. (2004a)</td>
<td>-n = 77, 7-17 yrs</td>
<td>-ICBFT – 14 weekly sessions (n = 24)</td>
<td>-% mean CY-BOCS reduction at post-trt: ICBFT 64.6%, group;</td>
<td>+ manualized protocol + sample eligibility characterized</td>
</tr>
</tbody>
</table>
| ICBFT, GCBT, WL control | -ICBFT: \(M=10.75\) yrs, 50% male  
-Group CBFT: \(M=12.9\) yrs, 44.8% male  
-WL: \(M=11.75\) yrs, 54.12 % male  
-Ethn: NR  
-Inc: primary OCD, stable on meds  
-Exc: TS, autism, MR, psychosis | -group CBFT – 14 weekly sessions (\(n = 29\))  
-family involvement: structured parental skills component in final 30 minutes of each session, 3 conjoint parent and child sessions, 3 dedicated sibling sessions  
-sessions are 90 minutes | CBFT 61.27%  
-OCD remission/without diagnosis at post-trt defined using ADIS: 88%  
ICBFT, 76% GCBFT  
-no change in WL condition  
-no significant differences in trt response between groups  
-all groups showed significant reduction in MASC and CDI scores, but no significant trt group effects  
-no difference in family functioning in either group  
-trt gains maintained at 3 and 6 month f/u  
-18 month f/u of 90% of active trt groups found all participants to have maintained post-trt gains with 70% of individual and 84% of GCBFT participants diagnosis free (Barrett et al., 2005)  
-effect size CY-BOCS\textsubscript{PRE-POST}  
ICBFT CY-BOCS = 3.27 GCBFT CY-BOCS = 4.03 WL CY-BOCS = -0.18  
(not reported by authors, calculated by Barrett et al., 2008) | +large sample size  
+reliable, valid assessments  
+family involvement  
+examined efficacy of ICBT vs. GCBFT  
-diagnostic interviews conducted only with parents  
-could not examine trt vs. no trt at f/u  
-meds type and dosage not controlled |

| March et al., (1994) CBT +/- meds or other trt | -\(n = 15\), 8-18 yrs \(M = 14.3\), 67% females (10 females, 5 males), 93% (n=14) on concurrent SSRI trt  
-Ethn: NR  
-Inc: primary OCD  
-Exc: NR | -\(M = 10\) weekly sessions (range 3-21)  
-Trt included Anxiety Management Component (AMT) including relaxation, self-talk, and other coping strategies  
-session length not reported  
-family involvement: psychoeducation and 3 planned, conjoint parent sessions | -50% mean decrease in CY-BOCS at post-trt  
-80% response rate  
-40% (\(n = 6\)) patients asymptomatic by NIMH-GOCS scale criteria at post-trt  
-3 of 15 patients “non-responders” (defined as less than 30% change on CY-BOCS at post-trt)  
-gains maintained at 18 months f/u  
-meds discontinuation in 6 patients with booster sessions | +protocol driven  
+reliable and valid assessments  
+f/u data  
+family involvement  
-sample eligibility not fully specified  
-varied trt intensity and content  
-f/u ranged from 3-21 months  
-no control condition |
<table>
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<tr>
<th>Study</th>
<th>Sample</th>
<th>Treatment</th>
<th>Outcome Measures</th>
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<tbody>
<tr>
<td>Seahill et al., (1996)</td>
<td>-n = 7, 10-15 yrs (M = 13), 71% male (5 males, 2 females), 71% on concurrent SRI trt</td>
<td>-M = 14 sessions -session length not reported -separate therapist for child and parent components of trt -family involvement: parent sessions were conducted every other week with goal of training parents to serve as coaches during homework exercises; psychoeducation and reduction of familial accommodation of OCD</td>
<td>-61% decrease in CY-BOCS at post-trt -gains maintained at 3-month f/u -6 patients received 2-3 booster sessions before 6-month f/u -3 subjects refusing CBT showed no symptom change over study interval -effect size: CY-BOCS\textsubscript{PRE-POST} = 2.04</td>
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<tr>
<td>Piacentini et al., (1994)</td>
<td>-n = 3 females, 9-13 yrs (M = NR) -1 child comorbid for SAD, ODD, and family conflict</td>
<td>-10, 2-hour weekly sessions -psychoeducation, optional behavioural reward program -family involvement: psychoeducation about OCD, facilitate familial withdrawal from OCD rituals</td>
<td>-56% mean reduction in CY-BOCS at post-trt -gains maintained at 12-month f/u -51% reduction in NIMH GOCS</td>
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<td>Wever &amp; Rey (1997)</td>
<td>-n = 57, 7-19 yrs (M = 13.7), 61% male, 17% on meds only; 79% CBT + meds</td>
<td>-2 weekly session, 12 daily sessions -session length not reported -CBT added after 2 weeks on meds -family involvement: family members seen briefly each session, reduction of family accommodation</td>
<td>CBT + meds -60% CY-BOCS score reduction at 4-weeks -68% remission/diagnosis free at post-trt -gains maintained at 24-month follow-up -39% of patients weaned off meds -comorbid ODD (21% of sample) demonstrated poorer treatment response</td>
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<tr>
<td>Franklin et al., 1998</td>
<td>-n = 14, 10-17 yrs (M = 14.1), 10 males, 4 females (71% male), 57%</td>
<td>-n = 7 intensive trt (18 x 90 min sessions over 1 month) -n = 7; 16 weekly trt (60 minute sessions)</td>
<td>-86% participants greater or equal to 50% reduction on CY-BOCS at post-trt WT: 64% decrease CY-BOCS</td>
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<tr>
<td>Study</td>
<td>Patient Characteristics</td>
<td>Treatment Details</td>
<td>Outcomes</td>
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| weekly on meds (n = 8)  
-Ethn: NR  
-Inc: primary OCD  
-Exc: severe comorbid MR | -family involvement: determined by clinical judgment (older patients requiring less parental assistance) | IT: 70% decrease  
-significant reduction in severity of “main fear” and “main ritual”  
-no significant impact on depressive symptoms  
-effect size CY-BOCS<sub>PRE-POST</sub> WT = 2.48; IT = 3.57; CBT-only = 4.32; CBT + meds = 2.29 (not reported by authors, calculated by Barrett et al., 2008) | -small sample for comparisons  
-no control condition  
-nonrandom assignment to conditions |
| Benazon et al., (2002)  
-CBT  
-<i>n</i> = 16, 8-17 yrs  
(<i>M</i> = NR), 50% female, 0% on meds  
-Ethn: 100% Caucasian  
-Inc: OCD diagnosis; CY-BOCS>16  
-Exc: bipolar or unipolar depression, tic disorder, conduct disorder, learning disability, psychosis, MR, autism, seizure disorder history, contraindicated medical condition, any concomitant trt, substance abuse past 6 months, significant suicide/homicide risk | -<i>n</i> = 12, 1-hour weekly sessions  
-family involvement: dedicated parental session in weeks 1, 3, 7, 12; parents encouraged to become co-therapists for their child at home; parents seen for final 10 minutes of each session | -48% mean CY-BOCS symptom reduction at post-trt  
-10 patients (62%) with at least 50% reduction in CY-BOCS  
-18.75% “non-responsive”  
-7 patients (44%) asymptomatic at post-trt  
-effect size: CY-BOCS<sub>PRE-POST</sub> = 1.65  
-decrease in anxiety severity and decrease in the severity of depressive symptoms  
-no f/u | +examined CBT in trt naïve children  
+no drug trt  
+parents involvement  
+sample eligibility characterized  
-non-randomized  
-raters not blind  
-no f/u data  
-no control group |
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Age Range</th>
<th>Gender Composition</th>
<th>Ethn.</th>
<th>Inc.</th>
<th>Exc.</th>
<th>interventions</th>
<th>Outcomes</th>
<th>Strengths</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>Piacentini et al., (2002)</td>
<td>n = 42, 5-17 yrs</td>
<td>(M = 11.8), 40% male, 60%</td>
<td>female, 52% on meds for OCD and remained on stable dose</td>
<td>NR</td>
<td>primary OCD</td>
<td>NR</td>
<td>CBT +/- meds</td>
<td>-M = 12.5 weekly sessions; number of weeks not reported; family involvement: psychoeducation about OCD; facilitate familial withdrawal from OCD rituals; all families attended first two sessions with subsequent involvement depending on specifics of case.</td>
<td>-45% mean reduction on NIMH GOCS</td>
<td>+protocol driven +family involvement +large sample size +reliable and valid assessments +examined predictors of response -sample eligibility not fully specified -post raters not blind -no control group -assessments at post did not include all measures -no f/u assessments -CY-BOCS not used at outcome</td>
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<tr>
<td>Waters et al., (2001)</td>
<td>n = 7, 10-14 yrs</td>
<td>(M = NR), 57% female (4 females), 5 meds</td>
<td>females), 5 meds</td>
<td>NR</td>
<td>primary OCD, CGAS&lt;70</td>
<td>primary MDD or other anxiety disorder, TS, schizophrenia, MR</td>
<td>CBT with family component</td>
<td>-M = 14 90-minute weekly sessions; family involvement: structured parental skills component in each session (30 min); 5 conjoint parent and child sessions; parental skills included: differential reinforcement, relaxation training, parental anxiety management, reduction of family accommodation in OCD, and problem solving skills</td>
<td>-86% success rate (diagnosis free at post-trt) – 6 of 7 -60% mean reduction in NIMH GOCS -60% mean reduction in CY-BOCS -results maintained at 3-month f/u -significant reductions in family accommodation -no change in family functioning</td>
<td>+protocol driven +standardized trt delivery +reliable and valid assessments of child and family functioning +no concurrent trt +sample eligibility characterized +assessment of child/family functioning -no control group -small sample</td>
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<tr>
<td>Valderhaug et al., (2007)</td>
<td>n = 28, 8-17 yrs</td>
<td>(M = NR), 50% female, 20% on meds</td>
<td>Norwegian</td>
<td>Norwegian</td>
<td>primary OCD dx</td>
<td>MR, anorexia nervosa, TS, psychotic</td>
<td>CBT with family component</td>
<td>-M = 12 sessions; family involvement: all families attended first 2 sessions with subsequent involvement depending on specifics of case. Most families attended additional sessions. -effect size: CY-BOCS_{PRE-POST} = 3.52</td>
<td>-75% response rate (&gt;50% reduction in symptoms) -60.6% CY-BOCS reduction post-trt -68.8% CY-BOCS reduction at 6-month f/u</td>
<td>+protocol driven +sample eligibility characterized -small sample</td>
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<tr>
<td>Study</td>
<td>Participants</td>
<td>Treatment Details</td>
<td>Outcomes</td>
<td>Notes</td>
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<td>Thienemann et al., (2001)</td>
<td>n = 18, 13-17 yrs</td>
<td>GCBT +/- meds or other trt</td>
<td>-14 x 2-hour weekly group sessions</td>
<td>-25% mean reduction in CY-BOCS</td>
<td>+protocol driven</td>
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<td>(M = 15.2), 12 male, 6 female</td>
<td>-family involvement: family included in 2 dedicated sessions (week 7 and 9); parents to attend final 15 min of each session</td>
<td>-family involvement: family included in 2 dedicated sessions (week 7 and 9); parents to attend final 15 min of each session</td>
<td>-50% participants greater or equal to 25% reduction on CY-BOCS at post-trt</td>
<td>+assessed parenting stress</td>
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<td>-reductions in MASC, CDI, CBCL total scores</td>
<td>-no change in either maternal or paternal PSI</td>
<td>+family involvement</td>
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<td>-no f/u data</td>
<td>-effect size: CY-BOCS&lt;sub&gt;PRE-POST&lt;/sub&gt; = 1.15 (not reported by authors, calculated by Barrett et al., 2008)</td>
<td>+examined efficacy of group CBT</td>
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<td>-no control group</td>
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<td>-sample eligibility not characterized</td>
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<td>-assessment raters not blind</td>
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<td>-concurrent other trts</td>
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<td>-no f/u data</td>
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<td>Himle et al., (2003a)</td>
<td>n = 19, 12-17 yrs</td>
<td>GCBT comparing tic-related and non-tic related OCD</td>
<td>-7 x 90-minute adolescent sessions</td>
<td>-56% response rate</td>
<td>+protocol driven</td>
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<td>(M = 14.6), 11 male, 8 female</td>
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<td>-session length not reported</td>
<td>-30% mean reduction in CY-BOCS</td>
<td>+examined group CBT in adolescents with comorbid tics</td>
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<td>(an optional 8&lt;sup&gt;th&lt;/sup&gt; session offered)</td>
<td>-no difference between CBT alone or CBT + meds</td>
<td>+trt included family component</td>
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<td>-family involvement: 1 optional parent session covering psychoeducation about OCD plus discussion of OCD-related family problem solving</td>
<td>No difference between CBT alone or CBT + tic disorder -6 month f/u</td>
<td>+f/u data</td>
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<td>-effect size not reported;</td>
<td>-non randomized</td>
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<td>-effect size: CY-BOCS&lt;sub&gt;PRE-POST&lt;/sub&gt; = 0.82 (not reported by authors, calculated by Barrett et al., 2008)</td>
<td>-no control group</td>
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<td>-OCD remission rate not reported</td>
<td>-drug tx not controlled</td>
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<td>-no f/u data</td>
<td>-# parents attending parent session not reported</td>
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<td>Martin and Thienemann (2005)</td>
<td>n = 14, 8-14 yrs</td>
<td>GCBT on meds</td>
<td>-14 weekly sessions, 90-minute format</td>
<td>-24.8% mean reduction in CY-BOCS at post-trt</td>
<td>+protocol driven</td>
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<td>(M = 11.3), 4 male, 9 female (29% male), 64% on meds</td>
<td>-family involvement: concurrent family sessions held each week in group format</td>
<td>-family involvement: concurrent family sessions held each week in group format</td>
<td>-43% participants greater than or equal to 25% decrease on CY-BOCS at post-trt</td>
<td>+data gathered from multiple sources</td>
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<td>-additional family problem solving strategies</td>
<td>-average post-trt CGI-I rating was “much improved”</td>
<td>-naturalistic clinic setting</td>
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<td>-significant reductions in CDI</td>
<td>-small n</td>
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<td>-no significant change in MASC</td>
<td>-no control group</td>
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<td>-no f/u data</td>
<td>-meds not controlled</td>
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<td>-parents reported a significant decrease in OCD-related functional impairment at post-trt</td>
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<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Description</td>
<td>Intervention</td>
<td>Comparator</td>
<td>Adverse Events</td>
<td>Findings</td>
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<td>Storch et al., (2007c)</td>
<td>$n = 40$, 7-17 yrs, (M = 13.3), 55% female, 60% on meds</td>
<td>ICBT plus family</td>
<td>-14 sessions of weekly (WT; $n = 20$) or intensive (daily; IT; $n = 20$)</td>
<td>-IT: 75% remission, 90% response -WT: 50% remission, 5% response -effect size CY-BOCS&lt;sub&gt;PRE-POST&lt;/sub&gt; WT = 1.73; IT = 2.62 (not reported by authors, calculated by Barrett et al., 2008)</td>
<td>-limited interrater reliability on CY-BOCS -3 month f/u not conducted on all participants</td>
<td>1.05 (not reported by authors, calculated by Barrett et al., 2008)</td>
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<tr>
<td>Asbahr et al., (2005)</td>
<td>$n = 40$, 9-17 yrs, (M = 13.7), 35% females, 0% on meds</td>
<td>GCBT</td>
<td>GCBT- 12 weeks ($n = 20$)</td>
<td>both trt groups showed significant improvement on CY-BOCS, NIMH, CGI, and CGAS</td>
<td>-manualized protocol</td>
<td>+protocol driven</td>
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<td>Fischer et al., (1998)</td>
<td>$n = 15$, 12-17 yrs, (M = 14.5), 60% male, 67% on meds</td>
<td>GCBT</td>
<td>-7 weekly sessions (1.5 hours)</td>
<td>-32% mean CY-BOCS reduction at post-trt</td>
<td>+examined efficacy of group CBT</td>
<td>+protocol driven</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Knox et al., (1996)  
- n = 4, 8-13 yrs
- (M = NR), 1 female
- CBT with parental involvement
- Ethn: NR
- Inc: NR
- Exc: NR

- 24 sessions (3/week)
- family involvement: parents involved
- no clinical dx of OCD at post-trt or 3 mos f/u
- 1 dx of OCD at 12-month f/u
- -24 sessions (3/week)
- -family involvement: parents involved
- -no clinical dx of OCD at post-trt or 3 mos f/u
- -1 dx of OCD at 12-month f/u
- protocol driven
- standardized parental involvement
- outcome assessment not sufficient
- design does not allow for comparative effects of CBT with/without parental involvement

Note:
ADIS = Anxiety Disorders Interview Schedule for DSM-IV; ADHD = attention deficit hyperactivity disorder; CBCL = Child Behaviour Checklist; CBFT = cognitive behavioural family therapy; CBT = cognitive-behavioural therapy; CDI = Children’s Depression Inventory; CGAS = Children’s Global Assessment Scale; CGI = Clinical Global Impression ratings; CY-BOCS = Children’s Yale-Brown Obsessive Compulsive Scale; Dx = diagnosis; Ethn: ethnicity; Exc = exclusion criteria; f/u = follow-up assessment; GCBT = group cognitive behavioural therapy; ICBFT = individual cognitive behaviour family therapy; ICBT = individual cognitive behavioural therapy; Inc = inclusion criteria; MASC = Multidimensional Anxiety Scale for Children; MDD = major depressive disorder; Meds = medication; MR = mental retardation; NIMH GOCS = National Institute of Mental Health Global Obsessive-Compulsive Scale; NIMH = National Institute of Mental Health Global Scale; NR = not reported; OCD = obsessive-compulsive disorder; ODD = oppositional defiant disorder; PDD = pervasive developmental disorder; POTS = Pediatric OCD Treatment Study; PTSD = posttraumatic stress disorder; SRI = serotonin reuptake inhibitors; SSRI = selective serotonin reuptake inhibitor; TS = tourette’s syndrome; Trt = treatment; WL = waitlist; WT = weekly treatment; Yrs = yrs

The data in the table are partially from Barrett et al. (2008)
Method

Participants

Children \((n = 82)\) ages 8 to 17 years with OCD were referred to the Anxiety Disorders clinic of a large children’s hospital in Toronto (from 2000 to 2008) by mental health professionals for assessment and treatment. All children participating met criteria for a primary diagnosis of OCD (see procedures below for details). Exclusionary criteria included psychosis, primary major depressive disorder, an eating disorder, autism spectrum disorder, a medical diagnosis which would interfere with treatment, and lack of proficiency in the English language. Children who had learning problems that would interfere with their understanding and participation in treatment (based on school information and clinical judgement) were also excluded. Children currently receiving psychoactive medication were included in the study as long as they agreed to remain on a constant dosage to reduce the likelihood of confounding treatment effects.

The sample was divided into 35 participants in an individual CBT condition and 47 participants in a group CBT condition (see Mendlowitz, 2010 for more detail). To explore whether the individual and group conditions could be combined to address the research questions, we investigated whether children in the two conditions differed on any of the measures (i.e., background variables, predictor measures) at pre-treatment. A series of independent samples \(t\)-tests and chi-square tests were conducted for continuous and categorical variables, respectively. A significant difference was found on the Children’s Yale-Brown Obsessive Compulsive Scale (CY-BOCS; Scahill et al., 1997) pre-treatment measure, with the individual group having more severe OCD symptoms than the group condition. However, further investigation demonstrated that the children in these two groups differed in terms of their history of streptococcus infection, with the individual group being higher on this variable. When controlling for this, no significant differences in treatment response were found between the two
conditions. This finding made us confident that the two conditions could be combined for analyses in the current study (i.e., \( n = 82 \)).

**Instruments**

**Questionnaire.** Demographic characteristics were collected in a general information, parent-report questionnaire designed by Dr. Sandra Mendlowitz, which was sent to all families prior to the assessment. This included child characteristics such as gender, age at initial assessment, medication status, and other significant medical information (e.g., history of streptococcal infection, other medical conditions, and psychiatric diagnoses). Aspects of OCD symptoms were collected such as age of OCD onset and illness duration (i.e., before treatment), and treatment history (i.e., previous intervention for OCD or another psychiatric diagnosis). Family characteristics such as parental marital status (i.e., living with one or both parents), socioeconomic status (i.e., based on educational level and occupation; Hollingshead, 1975), and mother, father, and sibling psychiatric diagnoses were also collected.

**Predictor measures.**

**Children’s Depression Inventory.** The Children’s Depression Inventory (CDI; Kovacs, 1992; norms updated in 2003) is a self-report, 27-item, screening tool that assesses the presence and severity of cognitive, affective, or behavioural symptoms of depression during the previous 2 weeks for children and adolescents ages 7 to 17 years.

The CDI measures five empirically developed factors: (1) Negative Mood; (2) Interpersonal Problems; (3) Ineffectiveness; (4) Anhedonia; and (5) Negative Self Esteem. In addition to the five subscales, the CDI differentiates by gender and age (i.e., 7 to 12 and 13 to 17 years). Children indicate which of three options best describes them over the past 2 weeks. Items are scored from 0 to 2, depending on the severity of the response, where 0 means the symptom is not present, 1 the symptom is present and mild and 2, the symptom is definitely present (e.g., 0 - “I like myself”, 1 - “I do not like myself”, 2 - “I hate myself”). Item scores are
summed to yield subscale scores and a total score of childhood depression. Total scores range from 0 to 54, with higher scores indicating greater levels of depressive symptoms. These scores are entered onto a profile form that contains associated T-scores that describe how a respondent’s scores compare with those of children or adolescents of the same age and gender from a normative sample. T scores greater than 65 are generally considered clinically significant when the child is from a “high base rate” group, such as children in a clinical setting. High scores suggest a problem and low scores indicate the absence of the problem.

The CDI has demonstrated relatively high levels of internal consistency, with a coefficient alpha of .86 for the normative sample (i.e., total score) and estimates for the five CDI factors ranging from .59 to .68. The CDI has good construct validity as determined by high correlations with similar depression measures and through factor analysis (Craighead, Smucker, Craighead & Ilardi, 1998; Kovacs, 1992).

**Multidimensional Anxiety Scale for Children.** The Multidimensional Anxiety Scale for Children (MASC; March, 1997) is a self-report, 39-item measure of anxiety symptoms in children and adolescents ages 8 to 19 years. It has been recommended as the self-report instrument of choice for both screening for anxiety disorders in youth and discriminating among youth with anxiety disorders and youth with other disorders (Silverman & Ollendick, 2005).

The MASC is comprised of various dimensions of anxiety symptoms including cognitive, emotional, behavioural, and physiological, with four scales and subscales representing empirically-derived domains of anxiety: (1) physical symptoms (tense/somatic); (2) harm avoidance (perfectionism/anxious coping); (3) social anxiety (humiliation/performance fears); and (4) separation/panic. Children rate how true each item is for them (e.g., “I feel tense or uptight”) on a 4-point Likert scale, ranging from 0 - “never true about me” to 3 - “often true about me.” When combined, the four scales create a scale measuring total anxiety.
The MASC is scored using a scoring grid, which yields total scores for each of the scales, a total score, an inconsistency index (which identifies careless or random responding), and an anxiety disorders index score (which can be used to identify children and adolescents who may be experiencing clinically significant levels of anxiety symptoms). These scores (with the exception of the inconsistency index score) are entered onto a profile form that contains associated T-scores that describe how a respondent’s scores compare with those of children or adolescents of the same age and gender from a normative sample. T-scores greater than 65 differentiate children with an anxiety disorder diagnosis from those without an anxiety disorder diagnosis (March, 1997).

The MASC has demonstrated moderate to strong internal consistency, with total scale and subscales ranging from .74 to .90 for different populations in different studies (March, Parker, Sullivan, Stallings, & Conners, 1997b; March et al., 1999; March, Sullivan, & Parker, 1999; Rynn et al., 2006). Test-retest reliability of both the MASC total and subscale scores has been found to be satisfactory with average intraclass correlation coefficients being .79 for the 3-week interval and .93 for the 3-month interval (March et al., 1997b). The MASC has been found to discriminate between (1) children with anxiety disorders and healthy children (Dierker et al., 2001), (2) children with anxiety disorders and children with ADHD (Dierker et al., 2001), and (3) children with anxiety disorders and children with depressive disorders (Rynn et al., 2006). The factor structure has been cross-validated in clinical and population samples (March, 1997; Rynn et al., 2006) and in a sample of youth with ADHD (March et al., 1997b) and holds across gender and age (March et al., 1997b; Rynn et al., 2006).

**MOOS Family Environment Scale.** The MOOS Family Environment Scale (FES) was originally developed in 1986 and was updated in 1994 (Moos & Moos, 1994). It is a self-report, 90-item, true/false questionnaire which assesses family members’ perceptions of their social environment. It can be completed by all family members and is designed for ages 11 and older.
The FES can be used to describe family social environments, to contrast parents’ and children’s perceptions, and to monitor family change. This FES is widely used in clinical and family research (Chipuer & Villegas, 2001; Moos & Moos, 1994; Piotrowski, 1999).

The FES measures three dimensions of the family social environment: (1) relationships; (2) personal growth; and (3) system maintenance and change. Each dimension contains at least two subscales for a total of 10 measured constructs: cohesion, expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, moral-religious emphasis, organization, and control. The three subscales pertaining to relationships (i.e., cohesion, expressiveness, conflict) primarily reflect internal family functioning. Ginsburg, Siqueland, Masia-Warner, and Hedtke (2004) have suggested that these three subscales appear to tap constructs that are commonly thought to be associated with the development and maintenance of childhood anxiety disorders; however, there is no data to support this hypothesis. The cohesion subscale measures the “degree of commitment, help, and support family members provide to each other” with higher scores indicating greater cohesion. The expressiveness subscale measures the “degree to which family members feel free to directly communicate feelings” with higher scores indicating greater expressiveness. The conflict subscale measures the “degree to which family members openly express anger, aggression, and disagreement toward each other” with higher scores indicated greater conflict (Moos & Moos, 1994). Items are in statement form, for example, “family members really help and support one another”, “family members often keep their feelings to themselves”, and “we fight a lot in our family.”

Scoring the FES can be achieved through the use of a manual (Moos & Moos, 1994) that contains a scoring protocol and scoring template. Each subscale comprises nine true-false items. A subscale raw score is generated by summing the 9 items and ranges from 0 to 9. Raw scores can be converted into standard scores.
Normative FES data have been collected and reported by Moos and Moos (1994). The normative sample consists of 1432 families from all over the USA, of diverse makeup (i.e., single parent, multi-generational, different ages) and varying ethnicity. Data also compare normal (n = 1432) and distressed (n = 788) families on the FES subscales. The raw means and standard deviations are reported for normal and distressed families and are as follows: cohesion (M = 6.73, SD = 1.47 for normal families; M = 5.25, SD = 2.13 for distressed families), expressiveness (M = 5.54, SD = 1.61 for normal families; M = 4.71, SD = 1.78 for distressed families; conflict (M = 3.18, SD = 1.91 for normal families; M = 4.02, SD = 2.07 for distressed families). The FES has been found to have good internal consistency (Cronbach Alphas ranging from .61 to .78 for the subscales); cohesion and conflict are among the subscales with the highest internal consistency, .78 and .75, respectively. Test-retest reliability ranges from .68 to .86 for a 2-month interval and .54 to .91 for a 4-month interval for both parent and adolescent ratings (Moos & Moos, 1994). Furthermore, the FES has been shown to have construct and discriminant validity. The manual describes in detail those FES constructs that have been shown to correlate with other constructs and measures to which it should and should not relate (Moos & Moos, 1994).

Outcome measure.

Children’s Yale-Brown Obsessive Compulsive Scale. The Children’s Yale-Brown Obsessive-Compulsive Scale (CY-BOCS; Seahill et al., 1997) is a clinician-rated, 10-item, semi-structured inventory assessing OCD-related symptom presentation and severity over the previous week in children and adolescents ages 8 to 17 years. The CY-BOCS can be administered to the child and parent(s), either separately or jointly, based on the clinician’s judgment (Merlo, Storch, Adkins, Murphy, & Geffken, 2007). There is also support for the use of self- and parent- report versions of the CY-BOCS for certain applications (e.g., Gallant et al., 2008; Storch et al., 2006). The CY-BOCS, when it is administered by the clinician, is referred to
as the “gold standard” in assessment of childhood OCD and remains the most common assessment measure (Merlo et al., 2007; Storch et al., 2004).

The CY-BOCS rates the symptom severity of both obsessions (five items) and compulsions (five items) across five scales: (1) time occupied by symptoms; (2) interference caused by symptoms; (3) distress related to symptoms; (4) resistance of symptoms; and (5) degree of control over symptoms. Scores are determined by the clinician on the basis of the child-report, parent(s) report, and behavioural observations. Items are rated on a 5-point Likert scale, with those assessing the severity of symptoms ranging from 0 - “none” to 4 - “extreme,” and those assessing the child’s control over his/her symptoms ranging from 0 - “complete control” to 4 - “no control”. Individual item scores are summed to provide an obsessions severity score (range = 0-20), compulsions severity score (range = 0-20), and total score, which is the sum of all items (range = 0-40). The ranges generally used in evaluating the total CY-BOCS score are mild (10–18; distress but not necessarily functional impairment), moderate (19–29; distress and functional impairment), and severe (30 or above; severe distress and serious impairment; March & Mulle, 1998).

The CY-BOCS also contains a symptom presentation checklist grouped by content area providing detailed information regarding the presence of various obsessions (i.e., contamination, aggressive, sexual, hoarding/saving, magical thoughts/superstitious, somatic, religious, miscellaneous) and compulsions (i.e., washing/cleaning, checking, repeating, counting, ordering/arranging, hoarding/saving, excessive games/superstitious, rituals involving other persons, miscellaneous; Scahill et al., 1997). Factor analytic studies of the CY-BOCS symptom presentation checklist have demonstrated four to six distinct factors or symptom dimensions (e.g., Bloch, Landeros-Weisenberger, Rosario, Pittenger, & Leckman, 2008).

The CY-BOCS has demonstrated a high level of internal consistency, with alphas of .80 and .82 for the obsessions and compulsions severity scores, respectively (Storch et al., 2004)
and with total score (i.e., 10-items) alphas ranging from .87 (Scahill et al., 1997) to .90 (Storch et al., 2004) using different groups of children and adolescents with OCD. Convergent and divergent validity of the CY-BOCS has been demonstrated, with researchers finding stronger associations to other measures of obsessional thinking and compulsive symptoms than to measures of general anxiety, depression, tic severity, aggression, or ADHD (Scahill et al., 1997; Storch et al., 2004). The CY-BOCS has repeatedly demonstrated good sensitivity to treatment effects (e.g., Benazon et al., 2002; Piacentini, Bergman, Jacobs, McCracken, & Kretchman, 2002; POTS, 2004; Seahill et al., 1997; Storch et al., 2007a).

**Procedure**

Following the referral, most participants waited 6-months to 1-year prior to their initial assessment. During the initial assessment, semi-structured diagnostic interviews were conducted by a registered psychologist (Dr. Sandra Mendlowitz) or psychology intern under her supervision. Interview schedules used during the course of this study included the Anxiety Disorders Interview Schedule for Children-Parent Version (ADIS-P; Silverman & Albano, 1996) and the K-SADS-PL (Kaufman et al., 1997). Diagnoses were established based on review of the semi-structured diagnostic interview and direct assessment by the psychologist, in addition to review of medical information provided by the referring clinician. All children participating met criteria for a primary diagnosis of OCD according to the DSM-IV-TR (APA, 2000) and other comorbid diagnoses were assessed for and documented. Parents also completed a demographic questionnaire including questions regarding child and family characteristics.

The assessing clinician provided information to the child and his or her parents about treatment options, as well as the expectation for at least one parent (preferably both) to attend all sessions on a consistent basis. Participants were informed of the use of questionnaires in the research study; if interest was expressed, parental consent and children assent was attained. The CY-BOCS was administered by the clinician to children and their parents in a family
assessment. Children then completed the CDI and the MASC. Participants meeting inclusion criteria were randomly assigned to an individual or group (i.e., 6 to 8 children) treatment condition when there were sufficient numbers available to participate. In assigning children to conditions, group composition was also a major factor (i.e., children in groups were of similar age) as well as therapist availability in order to avoid further delays in treatment due to ethical reasons (i.e., children had already experienced lengthy wait-times).

Given the variability in wait-times (average 6 to 8 weeks), participants were reassessed immediately before treatment began (i.e., pre-treatment assessment). At this time, children and parents were asked to complete the CY-BOCS independently; it was not clinician-rated but self-report due to time constraints, although, the clinician gave an overview and provided assistance. Of note, the initial CY-BOCS scores (which were clinician administered) were highly correlated with those of the child and parent at pre-treatment. Children also completed the CDI and the MASC. Parents and children (including those younger than 11 years of age) completed the FES independently to obtain their individual perceptions of their family environment.

Children in both treatment conditions received a manualized 12-week CBT program specifically designed for OCD (e.g., psychoeducation, cognitive techniques, practice sessions in exposure-response prevention, homework, modeling and promoting active coping strategies, etc.). Treatment included a concurrent parental treatment component which was matched session-by-session. Parents received direct information regarding their child’s progress, the lesson/strategy being taught, and how to deal with OCD symptom-related issues within the family (e.g., accommodation). Parents are also taught how to reinforce/generalize learning outside of the session and are assigned specific exposure tasks (i.e., homework) to do with their child on a daily basis. The same therapist treated each child-parent group, an identical model to individual treatment intervention. Immediately following treatment (i.e., post-treatment assessment, session 12) children and parents were asked to complete the same questionnaires
given at pre-treatment (see Mendlowitz, 2010 for more detail on the manual and study).

Predictor variables in the regression analyses are based on the characteristics gathered from the questionnaire and pre-treatment measures.

**Data Analysis**

Since this study involves multiple inferential statistical tests run on the same sample, capitalization of chance of finding differences when they do not exist (i.e., Type 1 error) is possible. Therefore, a significance level of .05 is not appropriate for this study. The Bonferroni correction will be applied to all *t*-tests to prevent inflation of significant findings.

**Descriptive statistics.** The demographic characteristics (i.e., child and family characteristics) collected in the questionnaire and the pre-treatment predictor measures will be reported by means of descriptive statistics. Their distribution by gender will be explored.

**Preliminary research analyses.**

**Question 1:** Do the perceptions of family environment differ among family members? Are there differences between boys and girls?

To explore whether perceptions of family environment differ among family members, means and standard deviations of child, mother, and father perceptions of family environment at pre-and post-treatment will be explored. Scatterplots will be plotted and Pearson correlations will be computed for each of the three FES subscales pertaining to family relationships (i.e., cohesion, expressiveness, conflict) obtained from children, their mothers, and fathers both pre- and post-treatment. The distribution of cohesion, expressiveness, and conflict by gender will also be examined.

**Question 2:** Do child perceptions of family environment change with treatment? Are there differences between boys and girls?

Given the focus of the study is the child’s perception of the family environment, only child ratings on cohesion, expressiveness, and conflict will be used for further analyses. To
explore whether child perceptions of family environment change with treatment, paired sample t-tests with pre-and post-treatment scores on cohesion, expressiveness, and conflict obtained from children will be conducted. Gender effects will also be examined.

**Main research analyses.**

**Question 1:** What is the treatment response? Does the child’s total CY-BOCS score change from pre-to post-treatment? Are there differences between boys and girls?

Given the focus of this study is the child’s report of his/her obsessions and compulsions (i.e., total CY-BOCS score), only these scores will be used for further analyses.

In this study, the child’s CY-BOCS score at pre-and post-treatment will be explored in detail (i.e., range of severity at pre-and post-treatment, raw post treatment change scores, percent change scores, 50% reduction in OCD symptoms, treatment remission). The most commonly used scores to measure change from pre-to post-treatment (or treatment response) are raw post-treatment change scores and percent change scores. All of these have one or more drawbacks, for example, that they over- or under-estimate the amount of change or do not reflect the actual degree of improvement within subjects (Steketee & Chambless, 1992).

Residual Gain Scores (RGS) control for both initial differences between individuals and measurement error inherent in the use of repeated measures on the same instrument (Steketee & Chambless, 1992). RGS will be used as the treatment response measure in the present study. To compute RGS, raw scores from two occasions (i.e., CY-BOCS total score at pre-and post-treatment) will first be converted into Z scores. Change is computed as follows: \[ \text{RGS} = Z_2 - (Z_1 \times r_{12}) \] in which \( Z_2 \) is the total CY-BOCS score at post-treatment, \( Z_1 \) is the total CY-BOCS score at pre-treatment, and \( r_{12} \) is the correlation between both total CY-BOCS scores at pre-and post-treatment. Thus, RGS rescales an individual’s score relative to typical gains made by others at the same initial level. Manning and DuBois (1962; as cited in Steketee & Chambless, 1992) suggest that RGS are particularly useful for investigating the correlates of change.
**Question 2:** Which child and family characteristics predict treatment response? Are there differences between boys and girls?

To explore which child (i.e., age at initial assessment, age of OCD onset, illness duration, SES, medication status, previous intervention for OCD, previous intervention for another psychiatric diagnosis, comorbid diagnoses, medication status, history of strep infection, depression; total CDI score, anxiety; total MASC score and anxiety disorders index, number of obsessions, number of compulsions) and family (i.e., parental attendance in treatment, marital status, mother, father, and sibling psychiatric diagnoses, FES subscales: cohesion, expressiveness, conflict) characteristics potentially predict treatment response, Pearson correlations were computed for all predictor measures and the RGS. Only those correlations greater than .3 and less than -.3 will be chosen as potential predictors for the subsequent question. Intercorrelations were computed for those predictors that had a moderate to strong relationship (i.e., greater than .3 and less than -.3) with the RGS to investigate possible problems with multicollinearity. Multicollinearity is used to describe the situation when a high correlation is detected between two or more predictor variables.

Based on the correlation matrix, only those characteristics which significantly correlate with the RGS (i.e., the strongest potential predictors) will be selected and included in subsequent regression analyses. Since this study is exploratory in nature, a linear forward method of entering predictors into the regression equation will be used. This method allows the computer to enter the predictors into the model one at a time in an order determined by the strength of their correlation with the treatment response variable (i.e., RGS). The effect of adding each is assessed as it is entered, and variables that do not significantly add to the success of the model are excluded.
Results

Descriptive Statistics

Child characteristics. The sample was comprised of 82 children and adolescents (44% boys, 56% girls) aged 8 to 17 years ($M = 12.3$, $SD = 2.0$). The distribution of most characteristics by gender was similar, and is presented in Table 2 (note: CY-BOCS will be explored in detail in main research analyses). Due to missing data, the sample sizes used in different analyses may vary. The majority of the sample was Caucasian (93%). Treatment attendance was excellent, with an average attendance of 11.9 of 12 sessions for children and parents. Participants reported a mean age of OCD onset at age 10 ($SD = 2.2$, range 5 to 15 years) and illness duration (i.e., before treatment) of 2 years ($SD = 1.8$, range 0 to 10 years). Forty-five percent ($n = 37$) of participants reported having previous intervention for OCD (i.e., medication, therapy, combination) and 17% ($n = 14$) of participants reported having previous intervention for another psychiatric diagnosis. In terms of comorbid diagnoses, 61% ($n = 50$) of the sample presented with a secondary comorbid diagnosis, with 23% ($n = 19$) of the sample presenting with more than one comorbid diagnosis. The most common comorbid diagnosis was generalized anxiety disorder (GAD; $n = 26$), followed by attention deficit hyperactivity disorder (ADHD; $n = 18$), specific phobia ($n = 10$), tic disorder ($n = 9$), separation anxiety disorder ($n = 4$), behaviour disorder ($n = 2$), social phobia ($n = 1$), learning disability ($n = 1$) and major depressive disorder ($n = 1$). At the time of treatment, 50% ($n = 37$) of the sample were on medication for their OCD or other diagnoses; 40% were on a selective serotonin reuptake inhibitor (SSRI), 4% were on Ritalin, 5% were on Ritalin and a SSRI, 1% were on medication for tics. Fifty-eight percent ($n = 48$) of the sample reported having a history of a streptococcus infection.

Family characteristics. Family SES, determined on the basis of education and occupation (Hollingshead, 1975) was primarily from classes I and II (i.e., 88.9%). Both parents
attended treatment with their child in 73% \( (n = 59) \) of cases, mother only in 21% \( (n = 17) \), and father only in 6% \( (n = 5) \) of cases. The majority of the participants \( (87\%; n = 70) \) were living with both parents, and the remaining came from single-parent families or blended families. According to parent self-report, 37% \( (n = 31) \) of mothers had at least one psychiatric diagnosis (note: mothers of girls reported more), the most common being major depression \( (n = 22) \) followed by GAD \( (n = 6) \). Twenty four percent of fathers had at least one psychiatric diagnosis, the most common being alcohol/substance abuse \( (n = 7) \) followed by major depression \( (n = 5) \) and OCD \( (n = 5) \). Parents reported that 23% \( (n = 19) \) of siblings had at least one psychiatric diagnosis (note: mothers of girls reported more), the most common being a learning disability \( (n = 9) \), and ADHD \( (n = 9) \).

**Predictor Measures**

**Children’s Depression Inventory.** Eighty-one children completed the CDI. The average \( t \)-score of child-reported depression at pre-treatment was 47.4 \( (SD = 8.2) \); thus, below the \( t \)-score indicative of a clinically significant problem (i.e., \( t \)-score = 65). On average, boys scored lower than girls on this measure (see Table 2). This difference was significant when the Bonferroni correction was applied.

**Multidimensional Anxiety Scale for Children.** Seventy-nine children completed the MASC. The average \( t \)-score of child-reported anxiety at pre-treatment was 53 \( (SD = 11.5) \), and the average \( t \)-score for the anxiety disorders index was 53 \( (SD = 12) \); thus, both below the \( t \)-score indicative of clinically elevated anxiety symptoms (i.e., \( t \)-score = 65). On average, there were no significant differences between girls and boys (see Table 2).

**MOOS Family Environment Scale.** This measure requires additional explanation; therefore, it is described separately below in Preliminary Research Analyses: Question 1.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Male ($n = 36$)</th>
<th>Female ($n = 46$)</th>
<th>$t$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age at assessment, years</strong></td>
<td>$12.2$ (2.0)</td>
<td>$12.3$ (2.0)</td>
<td>$-0.05$</td>
</tr>
<tr>
<td><strong>Age of OCD onset, in years</strong></td>
<td>$9.8$ (2.4)</td>
<td>$10.6$ (2.0)</td>
<td>$-1.54$</td>
</tr>
<tr>
<td><strong>Illness duration, years</strong></td>
<td>$2.4$ (2.1)</td>
<td>$1.7$ (1.4)</td>
<td>$1.87$</td>
</tr>
<tr>
<td><strong>Depression: Total CDI score</strong></td>
<td>$44.8$ (6.3)</td>
<td>$49.4$ (9.0)</td>
<td>$-2.70^{***}$</td>
</tr>
<tr>
<td><strong>Anxiety: Total MASC score</strong></td>
<td>$51.5$ (11.3)</td>
<td>$55.0$ (11.6)</td>
<td>$-1.35$</td>
</tr>
<tr>
<td><strong>Anxiety: Anxiety disorders index</strong></td>
<td>$51.8$ (12.9)</td>
<td>$53.8$ (11.3)</td>
<td>$-0.75$</td>
</tr>
<tr>
<td><strong>Chi-square test ($\chi^2$ test)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous intervention: for OCD</td>
<td>$50%$ (18)</td>
<td>$41%$ (19)</td>
<td>$0.62$</td>
</tr>
<tr>
<td>““: for another psychiatric diagnosis</td>
<td>$22%$ (8)</td>
<td>$13%$ (6)</td>
<td>$1.20$</td>
</tr>
<tr>
<td>Comorbid diagnoses</td>
<td>$58%$ (21)</td>
<td>$61%$ (28)</td>
<td>$0.05$</td>
</tr>
<tr>
<td>Medication status</td>
<td>$44%$ (16)</td>
<td>$46%$ (21)</td>
<td>$0.01$</td>
</tr>
<tr>
<td>History of strep infection</td>
<td>$56%$ (20)</td>
<td>$61%$ (28)</td>
<td>$0.23$</td>
</tr>
<tr>
<td>Both parents attended treatment</td>
<td>$64%$ (23)</td>
<td>$78%$ (36)</td>
<td>$2.07$</td>
</tr>
<tr>
<td>Marital Status (i.e., parents live together)</td>
<td>$92%$ (33)</td>
<td>$80%$ (37)</td>
<td>$2.04$</td>
</tr>
<tr>
<td>Mother: psychiatric diagnosis</td>
<td>$25%$ (9)</td>
<td>$48%$ (22)</td>
<td>$4.47^{**}$</td>
</tr>
<tr>
<td>Father: psychiatric diagnosis</td>
<td>$19%$ (7)</td>
<td>$28%$ (13)</td>
<td>$0.85$</td>
</tr>
<tr>
<td>Sibling: psychiatric diagnosis</td>
<td>$11%$ (4)</td>
<td>$33%$ (15)</td>
<td>$5.24^{**}$</td>
</tr>
<tr>
<td>Average number of obsessions</td>
<td>$3.4$ (2.1)</td>
<td>$3.83$ (1.96)</td>
<td>$-0.98$</td>
</tr>
<tr>
<td>Average number of compulsions</td>
<td>$3.7$ (2.6)</td>
<td>$4.9$ (2.6)</td>
<td>$-2.03^{**}$</td>
</tr>
</tbody>
</table>

*all Chi-square tests were based on yes/no (0, 1) responses; **significant at the .05 level (2-tailed); ***significant at the .01 level (2-tailed)*
**Preliminary Research Analyses**

**Question 1:** Did the perceptions of family environment differ among family members? Were there differences between boys and girls?

Scatterplots were plotted for cohesion, expressiveness, and conflict; they did not show any departures from linear relationships confirming that assumptions were met. Pearson correlations were appropriate.

The average perceptions of family cohesion were similar between family members (see Table 3) and highly correlated (see Table 4) both pre- and post-treatment, indicating high agreement regarding the degree of commitment, help, and support family members provide to each other. The average cohesion scores were more similar to the ‘normal’ families found in the standardization sample reported in the FES manual (i.e., \( M = 6.73, SD = 1 \); see methods for more detail) than to ‘distressed’ families (i.e., \( M = 5.25, SD = 2.13 \)). Table 5 demonstrates that there were no significant differences between boys’ and girls’ perceptions of family cohesion at pre- and post-treatment. Table 6 demonstrates the correlations by gender for cohesion. Although child and father were correlated at pre-treatment (Table 4), the correlation was only significant for girls (Table 6). That is, boys were not in agreement with their fathers regarding family cohesion at pre-treatment.

The average perceptions of family expressiveness were significantly different for child and mother and child and father both at pre- and post-treatment (see Tables 3 and 4); however, parents’ perceptions of family expressiveness were highly correlated at post-treatment indicating that following treatment they agreed on the amount family members felt free to directly communicate feelings. Children’s average expressiveness score was more similar to the ‘distressed’ families found in the standardization sample reported in the FES manual (i.e., \( M = 4.71, SD = 1.78 \); see methods for more detail) whereas mother and father average scores were more similar to ‘normal’ families (i.e., \( M = 5.54, SD = 1.61 \)) at pre- and post-treatment. Table 5
demonstrates that there were no significant differences between boys’ and girls’ perceptions of family expressiveness at pre- and post-treatment. Table 6 demonstrates the correlations by gender for expressiveness. In contrast to results found in Table 4, the following correlations were significant for girls: child and mother and mother and father at pre-treatment, and child and father at post-treatment. Although mother and father were correlated at post-treatment (Table 4), the correlation was only significant for girls (Table 6). That is, boys’ parents were not in agreement with each other regarding family expressiveness at post-treatment.

Finally, the average perceptions of family conflict between child and mother and mother and father were highly correlated both pre-and post-treatment (see Table 4), indicating high agreement regarding the degree to which family members openly express anger, aggression, and disagreement toward each other. Child and father perceptions of conflict were not correlated pre-treatment and were correlated post-treatment. The average conflict scores were more similar to the ‘normal’ families found in the standardization sample reported in the FES manual (i.e., $M = 3.18$, $SD = 1.91$; see methods for more detail) than to ‘distressed’ families (i.e., $M = 4.02$, $SD = 2.07$). Table 5 demonstrates that there were no significant differences between boys’ and girls’ perceptions of family conflict at pre- and post-treatment. Table 6 demonstrates the correlations by gender for conflict. Although child and father were correlated at post-treatment (Table 4), the correlation was only significant for girls (Table 6). That is, boys were not in agreement with their fathers regarding family conflict at post-treatment.
Table 3  
Means and Standard Deviations of Child, Mother, and Father Average Perceptions of Family Cohesion, Expressiveness, and Conflict at Pre-and Post-treatment

<table>
<thead>
<tr>
<th></th>
<th>Child (n = 76)</th>
<th>Mother (n = 72)</th>
<th>Father (n = 53)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td><strong>Pre-treatment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohesion</td>
<td>6.4</td>
<td>2.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Expressiveness</td>
<td>4.6</td>
<td>1.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Conflict</td>
<td>3.2</td>
<td>2.3</td>
<td>3.3</td>
</tr>
<tr>
<td><strong>Post-treatment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohesion</td>
<td>6.9</td>
<td>2.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Expressiveness</td>
<td>4.8</td>
<td>1.8</td>
<td>6.0</td>
</tr>
<tr>
<td>Conflict</td>
<td>2.8</td>
<td>2.3</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Table 4  
Correlations for Cohesion, Expressiveness, and Conflict obtained from Children, Mothers, and Fathers at Pre-and Post-treatment

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cohesion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child-Mother</td>
<td>.54** (69)</td>
<td>.39** (73)</td>
</tr>
<tr>
<td>Child-Father</td>
<td>.51** (52)</td>
<td>.62** (53)</td>
</tr>
<tr>
<td>Mother-Father</td>
<td>.61** (49)</td>
<td>.61** (48)</td>
</tr>
<tr>
<td><strong>Expressiveness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child-Mother</td>
<td>.16 (69)</td>
<td>-.01 (71)</td>
</tr>
<tr>
<td>Child-Father</td>
<td>.15 (52)</td>
<td>.24 (53)</td>
</tr>
<tr>
<td>Mother-Father</td>
<td>.14 (49)</td>
<td>.46** (48)</td>
</tr>
<tr>
<td><strong>Conflict</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child-Mother</td>
<td>.49** (69)</td>
<td>.55** (71)</td>
</tr>
<tr>
<td>Child-Father</td>
<td>.23 (52)</td>
<td>.36** (54)</td>
</tr>
<tr>
<td>Mother-Father</td>
<td>.58** (49)</td>
<td>.56** (47)</td>
</tr>
</tbody>
</table>

** Correlation was significant at the .01 level (2-tailed)
Table 5
Means and Standard Deviations of Boys’ and Girls’ Perceptions of Family Environment at Pre- and Post-treatment

<table>
<thead>
<tr>
<th></th>
<th>Boys (n = 33-36)</th>
<th>Girls (n = 43)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Pre-treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohesion</td>
<td>6.6</td>
<td>2.4</td>
<td>6.4</td>
</tr>
<tr>
<td>Expressiveness</td>
<td>4.4</td>
<td>1.3</td>
<td>4.6</td>
</tr>
<tr>
<td>Conflict</td>
<td>2.8</td>
<td>2.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Post-treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohesion</td>
<td>7.2</td>
<td>2.4</td>
<td>6.6</td>
</tr>
<tr>
<td>Expressiveness</td>
<td>4.5</td>
<td>1.7</td>
<td>5.0</td>
</tr>
<tr>
<td>Conflict</td>
<td>2.5</td>
<td>2.1</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Table 6
Correlations by Gender of Cohesion, Expressiveness, and Conflict Obtained from Children, Mothers, and Fathers at Pre-and Post-Treatment

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td></td>
<td>r (n)</td>
<td>r (n)</td>
</tr>
<tr>
<td>Cohesion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child-Mother</td>
<td>.53** (30)</td>
<td>.58** (39)</td>
</tr>
<tr>
<td>Child-Father</td>
<td>.14 (19)</td>
<td>.64** (33)</td>
</tr>
<tr>
<td>Mother-Father</td>
<td>.67** (18)</td>
<td>.61** (31)</td>
</tr>
<tr>
<td>Expressiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child-Mother</td>
<td>-.07 (30)</td>
<td>.32† (39)</td>
</tr>
<tr>
<td>Child-Father</td>
<td>.10 (19)</td>
<td>.18 (33)</td>
</tr>
<tr>
<td>Mother-Father</td>
<td>-.21 (18)</td>
<td>.39† (31)</td>
</tr>
<tr>
<td>Conflict</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child-Mother</td>
<td>.57** (29)</td>
<td>.41** (40)</td>
</tr>
<tr>
<td>Child-Father</td>
<td>.15 (19)</td>
<td>.23 (33)</td>
</tr>
<tr>
<td>Mother-Father</td>
<td>.71** (18)</td>
<td>.47** (31)</td>
</tr>
</tbody>
</table>

* Correlation was significant at the .05 level (2 tailed); **Correlation was significant at the .01 level (2-tailed)
**Question 2:** Did child perceptions of family environment change with treatment? Were there differences between boys and girls?

Paired samples $t$-tests were conducted with pre-and post-treatment scores on cohesion, expressiveness, and conflict obtained from children.

The results, using the Bonferroni correction, indicated that there was a significant change from pre-to post-treatment for cohesion, $t(73) = 2.63, p = .01$. The standardized effect size index, $d$, was -.03. There was no significant change for expressiveness, $t(73) = -.65, ns$ or conflict $t(73) = 1.66, ns$. The standardized effect size index, $d$, for expressiveness and conflict was -.07 and .19, respectively. When considering gender, there was no longer a significant change from pre-to post-treatment for cohesion for boys $t(32) = -2.06, ns$ or girls $t(40) = -1.64, ns$. The standardized effect size index, $d$, for boys and girls, was -.04 and -.28, respectively. The results for expressiveness and conflict remained nonsignificant.

**Main research analyses**

**Question 1:** What was the treatment response? Did the child’s total CY-BOCS score change from pre-to post-treatment? Were there differences between boys and girls?

**Children’s Yale-Brown Obsessive Compulsive Scale.** The total CY-BOCS scores for child, mother, and father (which were completed independently) were highly correlated (i.e., significant at the .01 level) at pre-treatment. As noted above, these scores were also highly correlated with the clinician-administered CY-BOCS at the initial assessment. Child total CY-BOCS scores were used for all analyses. Before discussing the treatment response, as measured by the Residual Gain Score (RGS), the total CY-BOCS at pre-and post-treatment will be explored in detail. Of note, pre-treatment CY-BOCS and post-treatment CY-BOCS scores were not correlated.

The sample ($n = 78$ at pre-treatment; $n = 80$ at post-treatment), was on average within the moderate range of severity at pre-treatment ($M = 21$, $SD = 6.1$, range = 9 to 34) and mild
range of severity at post-treatment ($M = 11.4$, $SD = 5.9$, range = 0 to 26). Boys ($n = 36$), were on average within the moderate range of severity at pre-treatment ($M = 19.0$, $SD = 6.4$, range = 9 to 32) and mild range of severity at post-treatment ($M = 10.2$, $SD = 5.7$, range = 0 to 24). Girls ($n = 42$ at pre-treatment; $n = 44$ at post-treatment), were on average within the moderate range of severity at pre-treatment ($M = 22.4$, $SD = 5.5$, range = 12 to 34) and mild range of severity at post-treatment ($M = 12.3$, $SD = 6.1$, range = 0 to 26). At pre-treatment, on the CY-BOCS, 2 children (<1%) scored within the ‘subclinical’ range (i.e., 0-9), 25 children (33%) scored within the ‘mild’ range (i.e., 10-18), 41 (54%) scored within the ‘moderate’ range (i.e., 19-29) and 8 (10%) scored within the ‘severe’ range (i.e., 30 or above). At post-treatment, 26 children (34%) scored within the ‘recovered’ range, 43 children (57%) scored within the ‘mild’ range, 7 (9%) scored within the ‘moderate’ range, and no children scored within the ‘severe’ range. See Table 7 for details.

Table 7
CY-BOCS Pre-and Post-Treatment Scores and Ranges

<table>
<thead>
<tr>
<th></th>
<th>Post-treatment</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recovered</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
<tr>
<td>Pre-treatment</td>
<td>Recovered</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>8 (32%)</td>
<td>16 (64%)</td>
<td>1 (4%)</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>13 (31.7%)</td>
<td>23 (56.1%)</td>
<td>5 (12.2%)</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>3 (37.5%)</td>
<td>4 (50%)</td>
<td>1 (12.5%)</td>
</tr>
</tbody>
</table>

At pre-treatment, the children in the sample presented with an average of three obsessions ($M = 3.64$, $SD = 2.00$) and four compulsions ($M = 4.36$, $SD = 2.65$). In terms of obsessions, there was no difference between boys and girls. In terms of compulsions, girls reported more compulsions (see Table 2). The most common obsessions included fears of contamination/illness or disease (78% of sample) and aggressive obsessions, including fears of
harm to self and others (75% of sample). The most common compulsions included checking for reassurance (71% of sample) and repeating rituals (65% of sample).

On average, the total CY-BOCS score decreased by 9.4 points from pre-to post-treatment (i.e., raw post-treatment change score); treatment had a significant effect, $t(75) = 10.5, p = .00$. On average, the total CY-BOCS score for boys, $t(35) = 6.82, p = .00$, and girls, $t(39) = 7.9, p = .00$, decreased as a result of treatment. Treatment had a significant effect for both genders.

Overall, treatment led to a 42% mean reduction on the CY-BOCS (i.e., percent change score) at post-treatment [for boys ($n = 36$); and girls ($n = 40$)]. With regard to gender, at post-treatment, there was no significant difference between boys and girls, $t(74) = 0.05, ns$. Therefore, treatment response, according to percent change in total CY-BOCS score from pre-to post-treatment, was similar for boys and girls.

Forty-three percent ($n = 30$) of the sample had an improvement of 50% or greater at post-treatment [42% of boys ($n = 14$); 43% of girls ($n = 16$)]. There was no significant difference between boys and girls, $\chi^2(1, n = 70) = 0.00, ns$.

When clinical remission (i.e., “excellent response” defined as a CY-BOCS total raw score of 10 or less; POTS, 2004) was used as the outcome measure (e.g., Barrett et al., 2008), 34% ($n = 27$) of the sample had a total CY-BOCS post-treatment score less than or equal to 10 points [48% of boys ($n = 13$); 52% of girls ($n = 14$)]. There was no significant difference between boys and girls, $\chi^2(1, n = 79) = 0.16, ns$.

**Residual gain score.** Residual gain scores (RGS) were used to measure treatment response. RGS ranged from -13.15 to 13.18 ($M = 0, SD = 5.81, n = 70$). RGS for boys ($n = 33$) ranged from -11.04 to 12.64 ($M = -0.48, SD = 5.4$) and girls ($n = 37$) ranged from -13.15 to 13.18 ($M = 0.43, SD = 6.2$). There was no significant difference between boys and girls, $t(68) = -0.65, ns$. Since successful treatment response means reduction in CY-BOCS scores from pre-to post-
treatment, negative RGS (i.e., less than 0) reflects a greater-than-expected reduction in total CY-BOCS scores at post-treatment considering the total CY-BOCS scores at pre-treatment and positive RGS (i.e., greater than 0) reflects a less-than-expected reduction in total CY-BOCS scores at post-treatment. Forty-six percent of children had a negative RGS (indicating treatment was more effective than expected) and 54% of individuals had a positive RGS (indicating treatment was less effective then expected). There was no significant difference between boys and girls, \( \chi^2 (1, n = 70) = .00, ns. \) A scatterplot was plotted of total CY-BOCS scores at pre-treatment and RGS; no patterns were seen, that is, treatment worked equally well for children with different pre-treatment CY-BOCS scores (i.e., both low and high pre-treatment CY-BOCS scores). Therefore, treatment response did not depend on where the child started at pre-treatment (i.e., total CY-BOCS pre-treatment score).

**Question 2:** Which child and family characteristics predicted treatment response? Were there differences between boys and girls?

Of note, pre-treatment CY-BOCS and post-treatment CY-BOCS scores were not correlated. Thus, treatment response was not predicted by the severity of symptoms at pre-treatment (i.e., pre-treatment CY-BOCS score).

The correlations between the RGS and the FES subscales (i.e., cohesion, expressiveness, conflict) were explored and scatterplots indicated a moderator effect of gender on the relationship of predictors with treatment response. Further exploration of the correlation between RGS and FES was conducted by gender. Thus, boys and girls were treated separately in further analyses. Of note, age was not an effect modifier.

From Table 8, it appears that different characteristics seem to predict treatment response for boys and girls. Boys did better in treatment than expected (i.e., negative/smaller RGS) if they did not have a sibling with a psychiatric diagnosis and if they scored lower on the FES expressiveness scale (i.e., less perceived expressiveness in the family). Girls did better in
treatment than expected (i.e., negative/smaller RGS) if, at pre-treatment, they were younger at age at initial assessment and age of OCD onset, had not had previous intervention for OCD, had a lower anxiety score (i.e., lower total MASC score), had a lower depression score (i.e., lower total CDI score), had a lower number of obsessions, and perceived their family as being more cohesive, more expressive, and having less conflict. However, judgments about the relative importance of these predictors are difficult because they were correlated. Therefore, the final conclusion can only be made after the regression analyses.
Table 8
*Pearson Correlations between Potential Pre-Treatment Predictors and Treatment Response*<sup>ab</sup>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pearson Correlation Coefficient</th>
<th>Boys (n=32-33)</th>
<th>Girls (n = 35-37)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at initial assessment</td>
<td>.1</td>
<td>.40&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Age of OCD onset</td>
<td>-.12</td>
<td>.35&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Illness duration (before treatment)</td>
<td>.23</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Previous intervention for OCD?</td>
<td>.02</td>
<td>.33&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>“ for another psychiatric diagnosis?</td>
<td>-.16</td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td>Comorbid diagnoses?</td>
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<td>-.15</td>
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</tr>
<tr>
<td>Number of comorbid diagnoses</td>
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<td>-.10</td>
<td></td>
</tr>
<tr>
<td>Have GAD?</td>
<td>.01</td>
<td>-.14</td>
<td></td>
</tr>
<tr>
<td>Have Specific Phobia?</td>
<td>-.11</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Have ADHD?</td>
<td>-.07</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>Have tic disorder?</td>
<td>-.16</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>Medication status?</td>
<td>-.02</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>History of strep infection?</td>
<td>-.05</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Depression: Total CDI score</td>
<td>-.09</td>
<td>.37&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Anxiety: Total MASC score</td>
<td>-.00</td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td>Anxiety: Anxiety disorders index</td>
<td>.03</td>
<td>.29</td>
<td></td>
</tr>
<tr>
<td>Number of obsessions</td>
<td>.11</td>
<td>.34&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Number of compulsions</td>
<td>.18</td>
<td>.29</td>
<td></td>
</tr>
<tr>
<td><strong>Family</strong></td>
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<tr>
<td>Both parents attended treatment?</td>
<td>.00</td>
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<tr>
<td>Living with both parents?</td>
<td>-.11</td>
<td>-.21</td>
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<tr>
<td>SES</td>
<td>.06</td>
<td>.07</td>
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</tr>
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<td>Mother have any psychiatric diagnosis?</td>
<td>-.05</td>
<td>.14</td>
<td></td>
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<tr>
<td>Mother depression?</td>
<td>.1</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>Father have any psychiatric diagnosis?</td>
<td>.04</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>Sibling have any psychiatric diagnosis?</td>
<td>.31</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td>Cohesion</td>
<td>-.04</td>
<td>-.40&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Expressiveness</td>
<td>.53&lt;sup&gt;**&lt;/sup&gt;</td>
<td>-.41&lt;sup&gt;*&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Conflict</td>
<td>.08</td>
<td>.45&lt;sup&gt;**&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>
a As measured by the RGS; *significant at .05 level (2-tailed); **significant at .01 level (2-tailed)
b Point-Biserial correlations (a special case of Pearson correlation) were used to explore the relationship between categorical dichotomous variables (i.e., yes/no; characteristics with question marks) and the outcome.

To investigate possible problems with multicollinearity, intercorrelations between those predictors with a moderate to strong relationship (i.e., greater than .3 and less than -.3) were performed (see Table 9). For boys, whether the sibling had any psychiatric diagnosis and expressiveness were not highly correlated \((r = .05)\). For girls, age at assessment and age of OCD onset were highly correlated \((r = .74)\), thus, to avoid multicollinearity, only age at assessment \((r = .4)\) was chosen because it had a stronger relationship with the RGS than age of OCD onset \((r = .35; \text{see Table 8})\).

Table 9

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age at initial assessment</td>
<td>--</td>
<td>.74</td>
<td>.11</td>
<td>.22</td>
<td>.14</td>
<td>.11</td>
<td>-.08</td>
<td>-.09</td>
<td>.23</td>
</tr>
<tr>
<td>2. Age of OCD onset</td>
<td></td>
<td>--</td>
<td>.06</td>
<td>.22</td>
<td>.16</td>
<td>.17</td>
<td>-.11</td>
<td>.07</td>
<td>.32</td>
</tr>
<tr>
<td>3. Previous Intervention for OCD</td>
<td>--</td>
<td>.36</td>
<td>-.1</td>
<td>-.21</td>
<td>.02</td>
<td>.04</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Total MASC score</td>
<td></td>
<td></td>
<td>--</td>
<td>.52</td>
<td>.35</td>
<td>-.18</td>
<td>-.25</td>
<td>.19</td>
<td></td>
</tr>
<tr>
<td>5. Total CDI score</td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>.38</td>
<td>-.37</td>
<td>-.26</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>6. Number of obsessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>-.27</td>
<td>-.33</td>
<td>.40</td>
<td></td>
</tr>
<tr>
<td>7. Cohesion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>.39</td>
<td>-.58</td>
<td></td>
</tr>
<tr>
<td>8. Expressiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>-.2</td>
<td></td>
</tr>
<tr>
<td>9. Conflict</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

To conclude, for boys, whether the sibling had any psychiatric diagnosis and expressiveness will be used as predictors in the regression equation. For girls, age at initial assessment, previous intervention for OCD, depression (total CDI score), anxiety (total MASC score), number of obsessions, cohesion, expressiveness, and conflict will be used as predictors in the regression equation.
Linear forward regression analyses were performed between the relevant predictors (i.e., independent variables) and the RGS (i.e., dependent variable) to identify those characteristics that had a significant effect on treatment response.

For boys, whether the sibling had any psychiatric diagnosis and expressiveness were used in the regression equation. Expressiveness explained 28% of the variance in treatment response, $F(1, 30) = 11.61, p = .00$. Thus, the less expressive boys perceived their family at pre-treatment, the better their treatment response. The regression equation is as follows: \( \text{Residual gain score} = -10.47 + 2.24 \times \text{expressiveness} \).

For girls, age at assessment, previous intervention for OCD, total MASC score, total CDI score, number of obsessions, cohesion, expressiveness, and conflict were used in the regression equation. Four of the suggested predictors were significant for girls: conflict, expressiveness, previous intervention for OCD, and total MASC score. Conflict came out first as the strongest predictor and explained 20% of the variance in treatment response, $F(1, 33) = 8.31, p = .01$. Expressiveness was next, and both conflict and expressiveness together explained 30% of the variance in treatment response, $F(1, 32) = 4.62, p = .04$. Previous intervention for OCD was next, and conflict, expressiveness and previous intervention for OCD together explained 40% of the variance in treatment response, $F(1, 31) = 5.02, p = .03$. Finally, total MASC score was last, and all four predictors together explained 50% of the variance in treatment response, $F(1, 30) = 5.80, p = .02$. The regression equation is as follows: \( \text{Residual gain score} = -10.00 - 1.03 \times \text{expressiveness} + .84 \times \text{conflict} + 5.32 \times \text{previous intervention for OCD} + .18 \times \text{total MASC score} \). See Table 10. That is, the more expressive and the less conflict girls perceived their family along with lower previous intervention for OCD and less anxiety, the better their treatment response.
Table 10
Forward Regression Analysis for Characteristics Predicting the CY-BOCS Residual Gain Score for Girls

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressiveness</td>
<td>-1.03</td>
<td>.51</td>
<td>-.27</td>
</tr>
<tr>
<td>Conflict</td>
<td>.84</td>
<td>.38</td>
<td>.29*</td>
</tr>
<tr>
<td>Previous Intervention for OCD</td>
<td>5.32</td>
<td>1.72</td>
<td>.43*</td>
</tr>
<tr>
<td>Total MASC score</td>
<td>.18</td>
<td>.08</td>
<td>.35*</td>
</tr>
</tbody>
</table>

*p < .05
Discussion

In terms of the family, results suggest that child and parent perceptions of the family environment differ in terms of expressiveness, with children perceiving their family as being ‘distressed.’ Although girls and boys had similar perceptions of their family environment, girls’ perceptions were more in agreement with their parents than boys’. At pre-treatment, children and their parents were in agreement in terms of family cohesiveness, and within the ‘normal’ range. Following treatment (i.e., post-treatment), children perceived their families as being even more cohesive; however, this was not significant when gender was considered. In terms of treatment response, results were consistent with previous research. Similar to past research, predictors were difficult to identify. Different characteristics were found to predict treatment response for boys and girls, with perceived family expressiveness a predictor for both. Specifically, boys had greater change in OCD severity at post-treatment if they perceived their families to be less expressive at pre-treatment. Girls had greater change in OCD severity if, at pre-treatment they had: lower anxiety, no previous intervention for OCD, and perceived their family as being more expressive and having less conflict.

The Family

Although it is recommended to involve the family in the treatment of childhood OCD (e.g., March et al., 1997a), relatively little is known about the role of the family in the development, maintenance, and treatment of childhood OCD. Childhood OCD often produces stress on the family because of negative parental involvement in the child’s symptoms (e.g., reassurance seeking, assistance with rituals) as well as modification of family routines to accommodate the child (e.g., Alonso et al., 2004).

In our study, the average perceptions of family cohesion were more similar to ‘normal’ than ‘distressed’ families and were highly correlated between family members (at pre-and post-treatment). This suggests high agreement regarding the degree of commitment, help, and
support family members provide to each other. When gender was considered, boys and girls had similar perceptions of family cohesion (at pre-and post-treatment), although, boys’ responses were no longer in agreement with their fathers regarding cohesion at pre-treatment. The average perceptions of family expressiveness were more similar to ‘distressed’ families for children and ‘normal’ families for parents (at pre-and post-treatment), and were not highly correlated between family members (except for parents at post-treatment). This suggests low agreement on the amount family members feel free to directly communicate feelings. Boys and girls had similar perceptions of family expressiveness (at pre-and post-treatment), although, a few differences were observed (1) girls were in agreement with their mother at pre-treatment (2) girls’ parents were in agreement at pre-treatment (3) girls were in agreement with their father at post-treatment and (4) boys’ parents were no longer in agreement regarding expressiveness at post-treatment. Finally, the average perceptions of family conflict were more similar to ‘normal’ than ‘distressed’ families (at pre-and post-treatment) and were highly correlated between family members (except for child and father at pre-treatment). This suggests high agreement (except for child and father at pre-treatment) on the amount family members openly express anger, aggression, and disagreement toward each other. Boys and girls had similar perceptions of family conflict (at pre-and post-treatment), although boys were no longer in agreement with their fathers regarding conflict at post-treatment.

Thus, child and parent perceptions of family expressiveness differed, that is, they were not in agreement in terms of how much members of the family can freely and directly communicate their feelings. Children view their families as being ‘distressed’ on this measure compared to population controls. This suggests that the children in this sample differed from normal child samples in their perception of expressiveness. From a clinical perspective this is not surprising; families of children with OCD are frequently under a significant degree of stress
given the disruptive nature of the disorder to family life. Children with OCD also often overestimate ‘threat’ and emotional responses and this may account for the discrepancy between parent and child on this parameter of the measure. In contrast, children perceptions of conflict and cohesion were similar to their parents and ‘normal’ when compared to population controls.

When considering gender, boys and girls perceptions (and possibly experiences) of their family environments are similar (i.e., both perceive family as being ‘distressed’ in terms of expressiveness and ‘normal’ in terms of conflict and cohesion). However, differences emerge when comparing perceptions with their parents (i.e., parents perceive family as being ‘normal’ in terms of expressiveness, conflict, and cohesion). Girls appear to be more in agreement with their parents than boys, in that they have similar perceptions of their family environment. For example, when looking at boys separately, in contrast to girls, their perceptions are not correlated at pre-treatment with their fathers for cohesion, mothers for expressiveness, and boys’ parents are not correlated for expressiveness. At post-treatment, boys are not correlated with their fathers for expressiveness or conflict, and parents are not correlated for expressiveness. This data may suggest that girls may be more ‘in tune’ with their parents and girls’ parents are more ‘in tune’ with each other in terms of certain aspects (i.e., their perceptions) of the family environment, than are boys. Interestingly, girls differed significantly from boys on other characteristics examined at pre-treatment: girls had higher depression scores and reported more compulsions (consistent with findings from Kirkcaldy, Furnham, & Siefen, 2010; Niehaus & Stein, 1997; Thomsen & Mikelson, 1991), and their mothers reported more psychiatric diagnoses (most common was major depression followed by GAD) in themselves and their other children (most common being LD and ADHD).

In terms of changes in family environment characteristics from pre- to post-treatment, on average, children who rated their families as being within the ‘normal’ range for cohesion at
pre-treatment, perceived their family as being even more cohesive at post-treatment. This improvement suggests that treatment had a positive impact on the family, as they may have become ‘empowered’ in their understanding of OCD and how to treat it (i.e., cohesion may be a marker for reduced accommodation); however, the effect size was small and the result not meaningful when gender was considered. Furthermore, the power of our sample size may have influenced this result or the difficulties in demonstrating improvement when the family was already high in cohesion to begin with (i.e., a ceiling effect). In contrast, children did not perceive their family environment changing from pre-to post-treatment in terms of expressiveness (which they perceived as being ‘distressed’) and conflict (which they perceived as being ‘normal’). While involving the family in treatment seemed to improve cohesiveness, it did not help improve family expressiveness, the one area that was problematic. One possible explanation is that this measure may not have been sensitive or explicit enough to detect this particular component of change in a systematic way.

In summary, the results from our preliminary research questions underscore the importance of including parents and exploring the family environment in the treatment of childhood OCD. Focusing on family characteristics, such as relationships, interactions, and notably family expressiveness in the treatment of childhood OCD may lead to improved family functioning, and in turn, better treatment response (e.g., Barrett et al., 2005; Storch et al., 2007b). Specifically, the literature associates greater family expressiveness (e.g., speaking more frequently, greater use of positive emotion words, encouragement and engagement of emotion discussion) with social competence, prosocial responding, and less anxiety (e.g., Denham & Grout, 1993; Suveg, Zeman, Flannery-Schroeder, & Cassano, 2005). That is, perhaps encouraging the discussion of emotion in families with children with OCD (e.g., in treatment
while providing constructive feedback) will help children identify and regulate their emotions in a more consistent way and thus, decrease anxiety.

**Treatment Response**

Treatment response in our study was measured in various ways and was similar to past research. Treatment response was similar for boys and girls and did not depend on the child’s severity at pre-treatment (i.e., treatment response was similar whether child was mild or moderate, for example). On average, at post-treatment, scores on the CY-BOCS decreased by 9.4 points and by 42%, children were within the mild range of OCD severity, 43% of children improved by 50% or greater, and 34% of children were in ‘remission’ (i.e., score of 10 or less). The RGS, which controls for both initial differences between children and measurement error inherent in the use of repeated measures on the same instrument (Steketee & Chambless, 1992) indicated that treatment was more effective than expected for 46% of children. Overall, these results continue to support the evidence that CBT is an effective treatment for childhood OCD.

Our study found high agreement on the CY-BOCS between child, mother, and father at pre-treatment (which were independent self-report), suggesting that either child or parent can be used as an informant of childhood OCD. The literature suggests that parents have a difficult time perceiving the internal world of their children and that children have a difficult time reporting internal states to their parents (Baldwin & Dadds, 2007); thus, poor parent-child agreement for anxiety disorders is generally found in the research (e.g., Choudhury, Pimental, & Kendall, 2003; Grills & Ollendick, 2003). The majority of these studies, however, have excluded children with OCD (e.g., Safford, Kendall, Flannery-Schroeder, Webb, & Sommer, 2005). It is likely that the agreement between children and parents in our study (at pre-treatment) is because the clinician met with the child and parents in a joint interview at the initial assessment (for the clinician-administered CY-BOCS interview) to discuss the child’s
OCD. It is also possible that the agreement was a by-product of the sample of parents and children seeking treatment at a specialty anxiety-research clinic, as these parents may be more aware of their child’s ‘internal states.’ As poor agreement between parent and child may influence treatment response (e.g., Hawley & Weisz, 2003), our findings may have important implications for clinical practice (i.e., agreement may impact the child and parents identifying similar treatment goals).

**Predictors of treatment response**

Many children with OCD were successfully treated with CBT; however, some remained symptomatic at post-treatment. This suggests room for improvement in using CBT to treat children with OCD and the need for predictors of treatment response to be identified. A number of characteristics were examined as predictors that could affect treatment response. Our research was similar to past in that predictors of treatment response were hard to identify. Interestingly, more predictors were identified for girls. This may be related to girls being more willing to acknowledge certain symptoms (e.g., anxious feelings, expressiveness in the family) than boys.

Only one predictor of treatment response was found for boys. Perceived family expressiveness predicted 28% of the variance in treatment response for boys. Specifically, boys had more change in OCD severity at post-treatment if they perceived their family to be less expressive at pre-treatment. One possible explanation for this finding is that boys who have a less expressive family environment improve more because they and their families get their needs met in therapy (i.e., learning to understand and express their emotions). In other words, treatment may be counterbalancing what they are not receiving at home. Another explanation is that the boys’ emotional needs and their perception of family expressiveness are not being captured in this measure (i.e., measure is not sensitive).
In contrast to boys, who had one predictor of treatment response, our study provided support for four variables (explaining 50% of the variance) that may play a role in predicting good treatment response (i.e., more change in OCD severity) for girls. These include: lower anxiety score (explaining 10% of the variance), not having previous intervention for OCD (explaining 10% of the variance), and perceiving their family as more expressive (explaining 10% of the variance), and having less conflict (explaining 20% of the variance). Similar to a recent study by Nakatani et al. 2009, a past history of intervention for OCD was associated with a worse outcome. It is important to note that the quality of the past treatment was not known (e.g., if it included ERP, if patient completed treatment).

Taken together, data suggest that different characteristics may play a role in predicting treatment response for boys and girls with OCD and thus, we need to consider gender when studying predictors of treatment response. Data also suggest that predictors are easier to identify for girls than boys. These findings also offer some support to the limited research in the area of the family environment and treatment response. It seems as though for both boys and girls, aspects of the family environment, namely expressiveness, may be important in determining which children’s OCD severity will improve the most. If family characteristics can be identified, we may be able to identify the families at greatest risk and provide more individualized treatment. For example, family psychoeducation, parent training programs, more intensive family involvement, or longer-term support (Durham, Allan, & Hackett, 1997). Family work may need to address broad family dynamics that may influence the family environment (e.g., parental psychopathology, parental emotional reactions, family organization style and patterns). Understanding the impact of the family environment on treatment response could have important implications for prevention and targeted treatment techniques. However, it is important to exercise caution in interpreting the unique predictive value of certain
characteristics, as variables do not operate in isolation but rather interact with other variables that have the potential to affect treatment response. It is likely that complex interactions between biopsychosocial characteristics determine treatment response.

In contrast to past research (e.g., Barrett et al., 2005; Mataix-Cols et al., 2002), having more severe OCD did not predict a worse treatment response. Our results suggest that children with severe OCD need not be excluded from treatment and can do well. This may be because the majority of children started treatment within the moderate range of severity and few were within the severe range (according to self-report on the CY-BOCS). More severe OCD may require the addition of medication, and/or more intensive treatment (e.g., booster or more frequent sessions).

Limitations and future directions

Although the results from our study are informative, there are limitations. In terms of the sample, it was homogenous with regard to ethnicity and socio-economic status, consisting of predominantly Caucasian children from two-parent, middle to upper class families. Treatment attendance was also very high, possibly due to the fact that these children and their parents, being treated at a specialty clinic, were treatment-seeking, generally well educated about OCD, and motivated for treatment; thus, may represent a higher functioning subgroup than children with OCD in the general population. Furthermore, most children were within the moderate range of OCD severity at pre-treatment, and about half had previous intervention for their OCD, which may not be representative of children with OCD in general. Although our study included children with comorbid disorders (61% of our sample presented with a comorbid disorder), the children in our sample did not present with severe depression or anxiety. Research has found, for example, that children with OCD and comorbid depression have higher family conflict compared to children with OCD and no depression (Canavera, Ollendick, May, & Pincus,
In addition, children with OCD and comorbid disorders may be a more severe sample of children which may impact treatment response (e.g., Storch et al., 2008b). It is important to note that about half of the children were on medication (for OCD and other diagnoses). Although the medication type and dosage was held constant for the duration of treatment it may have impacted the severity of OCD or any comorbid conditions.

Thus, due to the limitations of the sample, the children may not be reflective of all children with OCD and these results may not generalize to the larger population of children with OCD (i.e., non-Caucasian, non middle-upper class). Future research should examine a larger more diverse sample of children (including more severe comorbid disorders; Storch et al., 2010a) in order to provide further insight into the generalization of these findings. Additionally, the sample size will need to be significantly larger for adequate power and to enable the analysis of moderators, mediators, and treatment response. While this study represents an initial step in examining moderators of treatment response, a more in depth look at specific subpopulations that respond differentially to treatment is crucial for the development of tailored treatments (Kraemer et al., 2002). Investigating mediators will provide information regarding how treatment works, and will prove useful for the dissemination of critical treatment components (Kraemer et al., 2002).

Another limitation of this study was the use of self-report predictor measures (i.e., CDI, MASC, FES) provided by children and parents. Self-report measures may include subjective biases and can be influenced by social desirability, defensiveness, and level of insight. Inclusion of behavioural observations, family interviews, and other methodologies will reduce biases and provide further test of our findings.

In terms of limitations in our study pertaining to the family, an important limitation is that the measure used to assess the family environment (i.e., FES) is intended for ages 11 and
older and was used in the current study for children as young as 8 years old, as an appropriate scale did not exist at the time of the design of the study. As well, although it is commonly used in research with families of children with OCD, it cannot fully examine the many facets of family environment (e.g., interactions, level of stress, etc.) and thus, may not be sensitive enough to capture all aspects of the family environment that are problematic in children with OCD. For example, the expressiveness subscale does not specifically assess for expressed emotion (EE). EE is a measure of the family environment that predicts worse clinical outcomes for patients with a range of disorders (e.g., Hooley, 2007) and may be relevant in families with children with OCD. The Five Minute Speech Sample (FMSS; Magana, Goldstein, & Karno, 1986) may be a useful measure to examine EE. In the future, in addition to assessing family members’ perceptions, it may also be useful to directly observe family functioning with a clinician-rated measure such as the Family Assessment Clinician-Rated Interview (FACI; Ehrenreich, Micco, Fisher, & Warner, 2009).

In the future, it would be also be of value to explore the potential role that families (both parents and siblings) play in contributing to or maintaining a child’s OCD (i.e., accommodation), as this is often a relevant family issue (e.g., Storch et al., 2007b). A possible measure is the Family Accommodation Scale (Calvocoressi, Lewis, & Harris, 1995) or the adapted Family Accommodation Scale –Parent Report (FAS-PR; Storch, Merlo, & Geffken, 2005) which assess the degree to which family members accommodate a child’s participation in obsessions or compulsions.

In terms of treatment response, although these results are informative and similar to past research, it is important to reiterate that there are no consistent guidelines used to define and measure treatment response (Storch et al., 2010b). In the future, it will be important to use a consistent definition of treatment response to facilitate cross-study comparability. Our study,
similar to others measuring OCD treatment response, used the CY-BOCS. However, it was not
clinician rated (at pre-treatment for predictor measure or post-treatment for outcome measure)
and instead, children and parents were asked to complete the questionnaire independently.
Although this is a limitation, the scores were highly correlated with each other and with the
scores from the initial assessment (which \textit{was} clinician-rated). Finding strong agreement
between parent and child is interesting and future research should continue to examine parent-
child agreement in terms of OCD severity and symptoms, as well as any patterns of agreement
or disagreement (e.g., compulsions vs. obsessions, observable vs. non-observable symptoms)
and methods for reconciling discrepant reports (Kraemer, Wilson, Fairburn, & Agras, 2002).
Future research may wish to use the parent report (CY-BOCS-PR) and child report (CY-BOCS-
CR) versions of the CY-BOCS when their psychometric properties are well established (Storch
et al., 2006).

In the future, it may be useful to supplement the CY-BOCS with other measures, for
example assessing specific OCD symptoms and impairment, quality of life, and adaptive,
academic, social, and family functioning (see Storch et al., 2010a for a review). Having a
comprehensive picture of how OCD impacts the child’s life may help plan for treatment. For
example, the child and parent versions of the Child Obsessive Compulsive Impact Scale (COIS-
Parent and Child versions; Piacentini & Jaffer, 2009) measures how childhood OCD causes
impairment in specific areas of child psychosocial functioning (e.g., school, social,
home/family). Additionally, it would be beneficial to monitor progress during treatment by
assessing treatment response at another time point (e.g., half-way through treatment). Finally, it
is important to note that trials employing non-CBT controls are also necessary to determine
whether CBT or nonspecific characteristics or time confound treatment response. Reports of
treatment response (i.e., post-treatment CY-BOCS improvement) may also be influenced by the
fact that children expect improvement with treatment. In the future, it will be important to control for these confounds by combining reports from multiple raters for varying perspectives (e.g., child, parent, sibling, teacher), as well as behavioural observations (see Canavera, Wilkins, Pincus, & Ehrenreich-May, 2009 for a review), both pre-and post-treatment.

In terms of predictors of treatment response, limitations are as follows. Although our results suggest that having a parent with a psychiatric illness does not predict treatment response, it is important to note that this information was gained via parental self-report. In the future, it will be important to formally assess parental psychopathology, as this has been found to be related to treatment response in children with anxiety disorders (e.g., Berman et al., 2000). Parental psychopathology may affect the family environment and thus, may be relevant in children with OCD (e.g., Garcia et al., 2010).

Our data only provides information up to the time when treatment was concluded (i.e., post-treatment). It will be important to examine the long-term durability of treatment response to see if gains were maintained. Once predictors of treatment response are identified in a consistent way, we can look at longer-term predictors of treatment response (e.g., at 6 month and 1 year follow-up).

Other predictors that were not examined in this study (because they were not collected at our clinical practice) may be relevant to understand treatment response; moreover, they are relatively unexamined in children with OCD. For example, cognitive influences (i.e., treatment expectancy, motivation to change, insight), treatment specific characteristics (i.e., therapeutic alliance, compliance), therapist characteristics (i.e., gender, education level, amount of experience), and specific OCD symptom subtypes (e.g., checking) may also be important predictors to examine in the future (e.g., Keeley et al., 2008; Lochner & Stein, 2006). For example, a current meta-analysis by Bloch et al. (2008) indicated four symptom factors as the
underlying factor structure of OCD which may be useful to study in the future. Furthermore, deficits in executive functioning, which have been found to exacerbate symptoms and contribute to functional impairment in children with OCD (e.g., Simpson et al., 2006) may also be important to investigate. Executive functions are needed to independently plan and implement exposures and other therapeutic tasks (e.g., engage in thought challenging; Olley et al., 2007).

Future research should continue to examine the characteristics related to treatment response in children with OCD, as there is limited work in this area. This research is needed to refine and tailor treatment techniques to match child and family characteristics for the children who do not respond well to CBT. For example, more intensive treatment (including family involvement, as noted above), home-based CBT, motivational enhancement strategies (e.g., Krebs & Heyman, 2010), the addition of medication, or in-patient treatment may be needed to enhance CBT for certain children.

**Conclusion**

In summary, these findings contribute to the literature in supporting the evidence that CBT is an effective treatment for childhood OCD, emphasizing the importance that families may have in the treatment of OCD, and in our attempt to identify predictors. Furthermore, the differences found between boys and girls in predicting treatment response underscore the continued need to examine boys and girls separately. Better understanding of the predictors of treatment response, along with moderators and mediators of treatment response, should lead to more effective and targeted treatment techniques, and may open possibilities for prevention.
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