



Published in final edited form as:

J Clin Child Adolesc Psychol. 2010 September ; 39(5): 616–626. doi:10.1080/15374416.2010.501285.

Clinical and Cognitive Correlates of Depressive Symptoms among Youth with Obsessive Compulsive Disorder

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Abstract

Depression is the most common comorbidity among adults with obsessive compulsive disorder (OCD), yet little is known about depressive symptoms in childhood OCD. This study examined clinical and cognitive variables associated with depressive symptomatology in 71 youths (62% male, mean age= 12.7 years) with primary OCD. Youths presented with a range of depressive symptoms, with 21% scoring at or above the clinical cutoff on the self-report measure of depression. Higher levels of depressive symptoms were associated with higher levels of cognitive distortions assessed on measures of insight, perceived control, competence, and contingencies. Depressive symptoms were also linked to older age and more severe OCD. Low perceived control and self-competence and high OCD severity independently predicted depression scores.

Childhood obsessive compulsive disorder (OCD) is a chronic, distressing condition associated with marked impairment in academic, social, and family functioning (Moore, Mariaskin, March, & Franklin, 2007; Peris, Bergman, Langley, Chang, McCracken, & Piacentini, 2008; Valderhaug & Ivarsson, 2005). For many youth, this clinical picture is complicated further by the presence of co-occurring depressive symptoms and/or depressive disorders, which add to the burden of disease and confer additional concurrent and long-term risk (Storch et al., 2008). Among youth with OCD, rates of comorbid depressive disorder vary considerably, ranging from 13–46% depending on study methodology and measurement techniques (Geller, Biederman, Griffin, & Jones, 1996; Hanna, 1995; Valderhaug, Larsson, Gotestam, & Piacentini, 2006). However, the literature is consistent in indicating a steady increase in co-occurring depression as youths progress into adulthood (Abramowitz, 2004; Douglass, Moffitt, Dar, & McGee, 1995), suggesting that depressive symptoms and disorders may emerge secondary to OCD for some individuals (Abramowitz, Storch, Keeley, & Cordell, 2007; Diniz et al., 2004; Valleni-Basile et al., 1996). This developmental progression raises the question of which factors play a role in eliciting or exacerbating depressive symptomatology in youngsters with OCD. Indeed, given that comorbid major depressive disorder (MDD) has been shown to attenuate response to cognitive behavioral therapy (CBT; Abramowitz & Foa, 2000; Storch et al., 2008), the treatment of choice for child and adolescent OCD (Barrett, Farrell, Pina, Peris, & Piacentini, 2008), there is a critical need to better understand factors associated with emerging depressive symptoms, to develop strategies for addressing these symptoms, and to prevent the onset of more severe depressive disorders for youths with OCD.

The present study examined demographic, clinical, and cognitive correlates of co-occurring depressive symptomatology in youth with primary OCD with the overall aim of clarifying

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processes that contribute to depressive symptoms and might serve as potential targets in treatments for OCD complicated by co-occurring depressive symptomatology. Depressive disorders are the most common comorbidity among adults with OCD (Abramowitz et al., 2007) with 60–80% of adult OCD patients reporting a lifetime history of depressive episode (see Besiroglu, Uguz, Saglam, Argargun, & Cilli, 2007 for review). Although depressive disorders are less common in children with OCD (Moore et al., 2007), co-occurring depressive symptoms are observed with relatively high frequency and often emerge secondary to OCD (Demal, Lenz, Mayrhofer, Zapotoczky, & Zitterl, 1993; Geller et al., 1996). Research suggests that sub-syndromal depressive symptoms are just as impairing as MDD (Gotlib, Lewinsohn, & Seeley, 1995), highly stable (Tram & Cole, 2006), and predictive of subsequent depressive disorder (Fergusson, Horwood, Ridder, & Beautrais, 2005; Georgiades, Lewinsohn, Monroe, & Seeley, 2006; Keenan, Hipwell, Feng, Babinski, Hinze, Rischall, & Henneberger, 2008), underscoring the importance of identifying and intervening with them at the earliest stage possible.

To date, little research has addressed the correlates of depressive symptomatology in childhood OCD. However, descriptive research examining comorbid MDD among samples of adults with OCD reveals differences in three domains that may be a useful starting point for exploring sub-threshold depressive symptomatology in child and adolescent OCD: demographic features, clinical presentation, and cognitive variables. Cognitive processes are of particular interest as they are primary targets of CBT and different types of cognitive distortions are posited and observed in OCD versus depression (Asarnow & Bates, 1988; Asarnow, Carlson & Guthrie, 1987; Nedeljkovic, Moulding, Kyrios, & Doron, 2009; Nedeljkovic & Kyrios, 2007; Salkovskis et al., 2000). At a general level, cognitive models of psychopathology propose that distorted beliefs and faulty appraisals underlie emotional distress and psychological symptoms and elicit emotional and behavioral responses that perpetuate a cycle of distress (Beck, 1976). For individuals with depression, characteristic cognitive distortions involve negative self-evaluations (e.g., “I don’t do anything right”), self-talk (“I hate my life”) and hopelessness (“This will never work out for me.”). For those with OCD, common cognitive distortions involve the tendency to believe that thinking something is the same as doing it (thought-action-fusion) and the tendency to misinterpret normally occurring intrusive thoughts as meaningful (over-valued ideation; Salkovskis, 1989).

There are also potential areas of overlap between disorders. For instance, both OCD and depression may be associated with excessive self doubt, and the inflated sense of responsibility and blame frequently seen with OCD may lead to negative self-evaluations similar to those seen with depression (e.g., “Having bad thoughts makes me a bad person.”). A critical question requiring resolution is whether youths with OCD and co-occurring depressive symptomatology differ from youths with OCD-only on these specific cognitions. Research with adult samples has provided mixed results, with some evidence for the role of over-valued ideation in predicting MDD among individuals with OCD (Abramowitz et al., 2007).

Another potentially fruitful area of overlap rests with perceived control. In the depression literature, perceived control refers to the extent to which one can achieve a desired outcome. Weisz and colleagues (1992, 2001) have elaborated on this construct in their Contingency-Competence-Control (CCC) model, which suggests that depressive symptoms are linked to specific control-related beliefs that interact to produce a decreased sense of control over one’s environment. Within this framework, perceived control is comprised of perceived contingency and competence. *Perceived contingency* refers to views of how one’s behavior affects the desired outcome, and *competence* refers to the ability to act effectively in achieving the specified outcome. Low levels of perceived control as measured by these indices are posited to place youth at greater risk for depression. Research supports the diagnostic specificity of the CCC model (Weisz et al., 2001), thereby suggesting that control-related beliefs should

distinguish youth with OCD from youth who present with both OCD with depressive symptoms. Notably, the CCC model is thought to apply to subjective youth experiences of depression (Weisz et al., 2001), underscoring the value of self-report ratings scales (e.g., the Children's Depression Inventory; CDI; Kovacs, 1992) in assessing depressive symptomatology.

However, the argument can be made that low levels of perceived control are also operative in OCD (i.e., "I can't control my obsessive thoughts/images."). In support of this, Barrett and Healy (2003) found preliminary evidence that youth with OCD differ from their unaffected counterparts on measures of thought-action fusion, inflated feelings of responsibility, and perceived cognitive control. At the same time, it remains unclear whether these cognitions are linked to OC symptom severity (Verhaak & deHaan, 2007) or to depressive symptoms.

With regard to demographic variables, research suggests that older age is associated with higher rates of comorbid depressive disorders among adults with OCD (Angst & Dobler-Mikola, 1985; Millet et al., 2004; Tükel, Meteris, Koyuncu, Tecer, & Yazici, 2006). Although in the general child and adolescent population, increased age is associated with greater risk for depression, this has not yet been explored within the context of childhood OCD. With regard to gender, the adult literature suggests no gender differences among people with OCD and depression versus OCD-only, a pattern that may well differ in child and adolescent samples, where gender differences are prominent with boys being more likely to have OCD compared to girls, and depression becomes more common among girls compared to boys as children progress into adolescence.

Comorbid MDD subgroups also differ in their clinical presentation compared to individuals with OCD only, reporting earlier age of onset for their OCD symptoms and endorsing higher levels of obsessions, compulsions, and overall OCD symptom severity (Besiroglu et al., 2007; Hong et al., 2004; Tükel et al., 2006). These features are matched by reports of greater functional impairment and workplace disability as well as poorer quality of life (Abramowitz et al., 2007; Besiroglu et al., 2007; Hong et al., 2004; Tükel et al., 2006). Critically, there is also evidence that the nature of OCD itself may differ across comorbid subgroups. In adult samples, the presence of aggressive (Besiroglu et al., 2007), religious, and sexual obsessions has been associated with higher rates of comorbid MDD (Hasler, La Salle-Ricci, & Ronquillo, 2005; Hong et al., 2004), findings that are not surprising given the degree of distress typically elicited by these symptoms. By contrast, there do not appear to be differences in the level of insight across adult OCD patients with and without comorbid MDD (Abramowitz et al., 2007; Besiroglu et al., 2007). Understanding of differences in symptom topography and patient insight provides rich fodder for efforts to craft prevention and intervention protocols; however, this work has yet to be extended to the child and adolescent arena. Examining differences in symptom topography that are linked to depressive symptoms may shed light on how MDD emerges and interacts with OCD over time.

Building on this work in adults, the present investigation addressed the following questions: (1) Do youth with OCD and high levels of depressive symptoms differ from youth who are low in depressive symptoms in OC symptom severity and symptom topography? (2) Do these groups differ on cognitive distortions traditionally associated with OCD and depression? (3) Do control-related beliefs distinguish youth who are high and low in co-occurring depressive symptoms? And (4) what are the relative contributions of demographic, clinical, and cognitive factors in predicting depressive symptomatology?

We predicted that within our sample of youth with a primary diagnosis of OCD, depressive symptoms would be associated with distinct depressotypic cognitive patterns, specifically lower levels of perceived control, competence, and contingencies, and that they would also be

associated with lower levels of insight regarding OCD symptoms. Based on the increased rate of depression with age (Hong et al., 2004; Kessler, Avenevoli, & Merikangas, 2001; Lewinsohn, Hops, Roberts, & Seeley, 1993), we also predicted higher levels of depressive symptoms among older youths. Further, based on the adult OCD literature, we predicted that higher levels of depressive symptoms would be associated with higher levels of OCD symptom severity, obsessions, and compulsions. Finally, based on research suggesting that MDD emerges secondary to the strain imposed by OCD symptoms for some individuals (Besiroglu et al., 2007) and the literature linking control-related beliefs to depression (Weisz et al., 2001), we expected that symptom severity and perceived control would be unique predictors of depressive symptoms.

Method

Participants

Participants were 71 children and adolescents (Mean age = 12.7 years, range = 8–17 years) with a DSM-IV primary diagnosis of OCD, operationally defined based on the highest 0–8 clinician severity rating (CSR) derived from the Anxiety Disorders Interview Schedule, fourth edition (ADIS-IV; Silverman & Albano, 1996). All were participants in a controlled psychosocial treatment trial conducted at a medical center-based OCD specialty program. All youth were free of OCD-related medication at study entry and had no prior CBT treatment. The sample was 62% male. Most were identified by parents as Caucasian (77%), followed by Latino (10%), Asian (4%), African American (3%), and Other (6%).

Exclusion criteria were kept intentionally broad, with youth excluded only if they did not have primary OCD or met criteria for secondary diagnoses that would preclude participation in the treatments offered in the treatment trial (e.g., pervasive developmental delay, mental retardation, psychotic disorder, severe depression). The resulting sample exhibited high rates of comorbidity overall, with 70% ($n = 50$) meeting criteria for two diagnoses and 30% ($n = 21$) meeting criteria for more than three. Among these youth, non-OCD anxiety was the most common comorbidity, with 48% ($n = 34$) of participants meeting criteria for at least one anxiety disorder. On the ADIS-IV, one participant met criteria for full MDD that was determined to be secondary to OCD as determined by CSR rating.

Procedure

The study was approved by the University Institutional Review Board. Parental consent and youth assent were obtained at the outset of the initial visit, and families then went on to complete a comprehensive psychiatric evaluation guided by DSM-IV diagnostic criteria. Child and adolescent participants were diagnosed with OCD using the ADIS-IV and the CY-BOCS (Scahill et al., 1997), which were completed jointly by parent and child.

All evaluations were administered by doctoral-level psychologists or doctoral students in clinical psychology as part of a larger baseline assessment. Prior to administering the study interviews, all students received in-depth training by the clinic director or associate director based on the guidelines specified by the ADIS-IV and CY-BOCS developers. A licensed clinical psychologist supervised all clinic evaluations. Following the diagnostic interview, youth completed a battery of self-report measures, including measures of perceived control and over-valued ideation.

Measures

Anxiety Disorders Interview Schedule-IV (ADIS-IV; Silverman & Albano, 1996)—

The ADIS-IV is a semi-structured interview that assesses the major DSM-IV anxiety, mood, and externalizing disorders experienced by school-age children and adolescents. In addition to

producing DSM-IV diagnoses, the instrument also assigns clinical severity ratings (CSRs) following an 8-point scale (0= not at all, 8= very, very much) for each diagnosis. The current version is well-established in the empirical literature and has demonstrated sound reliability with regard to both symptom scales and diagnoses (Silverman, Saavedra, & Pina, 2001). Support for the concurrent validity of the ADIS-IV is evidenced by significant correlations between specific ADIS-IV anxiety diagnoses and corresponding scales of the Multidimensional Anxiety Scale for Children (MASC; March, 1998; Wood et al., 2002). Within our group, consensus between diagnoses assigned by individual study clinicians and diagnoses assigned by an independent diagnostic review panel comprised of licensed clinical psychologists specializing in childhood OCD produced $\kappa=.89$ (Piacentini et al., 2007; Wood et al., 2002).

Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS; Scahill et al., 1997)—The CY-BOCS is a semi-structured 10-item clinician-rated measure of OCD severity. The measure possesses adequate internal consistency, ($\alpha = .90$) and inter-rater reliability (ICCs = .79) (Storch et al., 2004). It has proven to be sensitive to the effects of treatment (Merlo, Lehmkuhl, Geffken, & Storch, 2009; POTS Team, 2004). Discriminant validity has been documented based on low correlations with self-reported depression on the Children's Depression Inventory (CDI; Kovacs, 1992) and self-reported anxiety on the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978; Scahill et al., 1997). In the present sample, Cronbach's $\alpha = .73$ for the total score, with inter-rater reliability of $r = .93$ for the total score.

Children's Depression Inventory (CDI; Kovacs, 1992)—The CDI is a 27-item measure that requires respondents ages 7–17 years to select which of three statements best describes themselves over the past two weeks. The CDI has well-established psychometric properties, including good internal consistency and test-retest reliability (Kovacs, 1992) and it remains the most widely-used measure of child and adolescent depression (Brooks & Kutcher, 2001; Klein, Dougherty, & Olino, 2005). In this study, depressive symptoms were examined both continuously and categorically. For categorical analyses, a cut-point of 13 was used based on prior research suggesting that this cut-point indicates moderate levels of depression (Kazdin, 1989; Cole et al., 1998; Tram & Cole, 2006) as well as published norms indicating that it demarcates youth in approximately the upper quartile of depressive symptoms for the age group of the current sample (Kovacs, 1992). Internal reliability within the present sample was high ($\alpha = .90$).

Self-Perception Profile for Children (SPPC; Harter, 1982)—Youth perceptions of competence were measured using the 36-item form of the SPPC. This measure provides an index of positive mental health and is completed by children. Items are answered on a 4-point scale ranging from “not at all” to “really true for me”. The SPPC has demonstrated good internal consistency and 9-month test-retest reliability (Harter, 1982), convergent validity with measures of depression (see Winters, Myers, & Proud, 2002; Weisz et al., 2001). Internal reliability within the present sample was high ($\alpha = .92$).

Perceived contingency was measured using the 30-item PContin measure (Weisz, Sweeny, & Proffitt, 1991), a youth self-report form on which half of the items evaluate positive contingencies (“Kids who work hard in school get good grades”) and half measure negative contingencies. The measure has demonstrated good internal consistency and six month test-retest reliability (Weisz et al., 2001). Internal reliability within the present sample was high ($\alpha = .90$).

Perceived Control Scale (PCS; Weisz, Southam-Gerow, & Sweeney, 1998)—Perceived Control was measured using the PCS, a 24-item youth self-report scale that evaluates

the degree to which youngsters feel they can exert control over the outcome of a given situation. Items are answered on a 4-point Likert scale ranging from 1 (“Very false”) to 4 (“Very true”). The PCS has demonstrated strong internal consistency, test-retest reliability, and construct validity as evidenced by significant correlations with the CDI (Magaro & Weisz, 2006; Weisz et al., 2001; Weisz, Sweeney, Proffitt, & Carr, 1993). Internal reliability within the present sample was high ($\alpha = .93$).

Insight—Children’s insight into their OCD symptoms was assessed using a single interviewer-administered item, “Do you think your problems or behaviors are reasonable (i.e., make sense)?” adapted from the Overvalued Idea Scale (OVIS; Neziroglu et al., 1999) for use in the Pediatric OCD Treatment Study (POTS, 2004) and used in other studies of childhood OCD (Lewin et al., in press). This item was scored on a Likert scale of 0 (excellent insight) to 4 (no insight/delusional). Inter-rater reliability for this item produced a kappa of .95.

Data Analysis

The means and standard deviations of key study measures are presented in Table 1. Analyses began with an examination of associations between depressive symptomatology (measured as a continuous variable) and key demographic, clinical, and cognitive variables. These analyses assessed associations between self-reported depressive symptoms on the CDI and demographic features (child age, gender, and ethnicity), OCD symptom severity (CY-BOCS), OCD symptom clusters derived from the CY-BOCS, and cognitive distortion measures (OVIS, SPPC, PCS, and Pcontin).

Parallel analyses assessed depressive symptoms as a categorical variable, using a cut-point of 13 on the CDI to indicate clinically significant depressive symptomatology. This cut-score was selected based on prior research (Kazdin, 1989; Cole et al., 1998; Tram & Cole, 2006) as well as published norms indicating that it demarcates youth in approximately the upper quartile of depressive symptoms for our age group (Kovacs, 1992). We began by examining rates of clinically significant depressive symptoms within our sample of youth with OCD. Next, group differences in cognitive distortions were examined via univariate analyses which controlled for OCD symptom severity. These controlled for OCD symptom severity while examining group differences on the OVIS, SPPC, PCS, and Pcontin measures. Finally, to clarify the relative contribution of demographic, clinical, and cognitive variables in predicting depressive symptoms, hierarchical regression analyses were conducted predicting depressive symptoms on the CDI from age, symptom severity, perceived competence, perceived contingencies, and perceived control.¹ Missing data were rare (1%) and were imputed by substituting the mean for continuous variables.

Results

Analyses of Depressive Symptoms as a Continuous Variable

As shown in Table 2, bivariate correlation analyses revealed a positive association between depressive symptoms on the CDI and older age, greater overall OCD symptom severity, higher levels of obsessions, and higher levels of compulsions. Analyses examining symptom clusters derived from the CY-BOCS revealed that higher levels of counting compulsions were associated with higher levels of depressive symptomatology ($r = .29, p < .01$). However, there were no other statistically significant associations between depressive symptoms and specific categories of obsessions or compulsions (see Table 3).

¹A separate set of analyses was conducted without the one participant who met criteria for full MDD. When this participant was removed, the overall pattern of findings remained the same. However, a significant positive correlation emerged between CDI scores and sexual obsessions ($r = .24, p < .05$).

As predicted, correlation analyses revealed statistically significant associations between co-occurring depressive symptomatology and cognitive distortions, with higher levels of depressive symptoms linked to lower levels of perceived contingencies, perceived competence, and perceived control (see Table 2). Likewise, a small positive relationship emerged between CDI reports and OVIS scores such that higher levels of depressive symptomatology on the CDI were associated with higher scores on the OVIS (indicating lower levels of insight).

Categorical Analyses of Youths with Clinically Significant Levels of Depressive Symptoms

To better elucidate features associated with depressive symptoms for youth with OCD, we ran parallel analyses examining groups of youngsters who were above and below the selected CDI cut-off. Overall, 21% of youth met criteria for both OCD, defined by the ADIS, and clinically significant depressive symptoms, defined by a score of 13 or higher on the CDI. Consistent with the literature on child and adolescent depression (Hong et al., 2004; Kessler et al., 2001; Lewinsohn et al., 1993), youth with both OCD and significant depressive symptoms were more likely to be older than youth with OCD only ($t(68) = -.3.60, p < .001$). There were no gender differences in rates of depressive symptomatology.

Group Differences in Symptom Severity and Symptom Profiles

As expected, the High CDI group reported higher levels of OCD symptom severity on the CY-BOCS obsessions ($t(68) = -3.13, p < .001$) and compulsions subscales ($t(68) = -2.51, p < .05$), as well as higher total scores ($t = 3.19, p < .01$). In terms of symptom topography, t-tests revealed group differences in hoarding obsessions ($t(68) = -2.43, p < .05$), somatic obsessions ($t(68) = -2.27, p < .05$), and aggressive obsessions ($t(68) = -2.12, p < .05$). There were significant group differences in counting ($t(68) = -2.10, p < .05$) but no other compulsive symptom categories.

Group Differences in Cognitive Distortions

As predicted, the study groups differed on all three dimensions of perceived control even when baseline CY-BOCS symptom severity was controlled. Specifically, the High CDI group evidenced lower levels of perceived contingencies ($F(2, 69) = 10.80, p < .01$), perceived self-competence on the SPPC ($F(2, 69) = 16.37, p < .001$), and perceived control ($F(2, 69) = 12.39, p < .001$). The two study groups did not differ on levels of insight into their OCD symptoms although there was a trend in that direction ($t(68) = -1.96, p = .06$).

Predicting Co-occurring Depressive Symptoms

Hierarchical regression analyses (Cohen & Cohen, 1983) were conducted in an effort to better understand the relative contribution of demographic, clinical, and cognitive variables in predicting depressive symptoms. Specifically, youth self-report on the CDI was predicted from age, OCD symptom severity, perceived competence, perceived contingencies, and perceived control. As illustrated in Table 4, the initial model predicted depressive symptoms on the CDI from youth age ($b_1 = .29, p < .01, R^2 = .09$). CY-BOCS total symptom severity was entered next in Model 2 and predicted depressive symptoms above and beyond the initial model ($b_2 = .43, p < .001, \text{Model } 2 R^2 = .27, R^2 \text{ change} = .19, F \text{ change}(1, 68) = 17.20, p < .001$). In Model 3, self-competence as measured via the SPPC was next entered, negatively predicting depressive symptoms ($b_3 = -.56$). This model predicted depressive symptoms above and beyond the second model (Model 3 $R^2 = .55, R^2 \text{ change} = .28, F \text{ change}(1, 67) = 41.26, p < .001$). In Model 4, perceived contingencies were entered next but did not predict depressive symptoms above and beyond the other variables ($b_4 = -.10, p = \text{n.s.}$), and did not improve upon Model 4 ($R^2 = .56, R^2 \text{ change} = .00, F \text{ change}(1, 66) = 1.12, p = \text{n.s.}$). The final model (Model 5) included perceived control, which significantly predicted depressive symptoms ($b_5 = -.39, p < .01$). This model predicted CDI scores above and beyond the fourth model accounting for a significant

proportion of the variance in depressive symptoms (Model 5 $R^2 = .62$, R^2 change = .06, F change (1, 65) = 10.86, $p < .01$).

Discussion

This study examined clinical and cognitive correlates of depressive symptomatology among a sample of treatment-seeking youth with OCD. As expected, co-occurring depressive symptomatology was linked to older age and to higher levels of obsessions, compulsions, and overall OCD symptom severity, a pattern that held when the CDI was examined both continuously and categorically. Likewise, both continuous and categorical analysis of the CDI revealed links between depressive symptoms and lower levels of perceived competence, contingencies, and control. When the CDI was treated as a categorical variable, 21% of youngsters with OCD were found to have levels of depressive symptomatology that placed them in roughly the upper quartile according to published norms. The high and low CDI groups differed in the nature of their OCD symptoms such that hoarding, somatic, and aggressive obsessions were associated with higher levels of depressive symptoms as were counting compulsions; however, this pattern was not evident in continuous analyses. Finally, there was strong support for the hypothesis that symptom severity and perceived control would make unique contributions to depression, with a hierarchical regression model of these variables accounting for a substantial amount of the variance in co-occurring depressive symptomatology.

Although in general, comorbidity is the norm for youth with OCD, rates of co-occurring depression have been found to vary substantially across studies. In this study, 21% of youth endorsed clinically significant depressive symptomatology on the CDI using previously established clinical cut-points for moderate depressive symptoms (Cole et al., 1998; Kazdin, 1989) and published norms (Kovacs, 1992). These findings speak to the prevalence of depressive symptoms among youth with OCD, particularly as they progress towards adolescence when depression rates increase overall. These data have important implications for intervention efforts, given that comorbid depression has been shown to diminish response to CBT (Abramowitz & Foa, 2000; Storch et al., 2008), the gold standard treatment for child and adolescent OCD. Indeed, current intervention strategies may need to be retooled to address depressive symptoms both as direct treatment targets and as potential barriers to effective OCD treatment. Such modifications may involve extending cognitive restructuring techniques to specifically target depressogenic cognitions. In addition, as the present findings link low levels of perceived control to depressive symptoms, ERP therapists may benefit from highlighting clear links between the child's actions (e.g., exposure exercises) and their outcomes (reduced anxiety) in order to enhance perceived control and self efficacy. Alternatively, modified protocols may involve efforts to integrate behavioral activation strategies commonly employed in CBT for depression, as these strategies may have the joint benefit of improving mood and reducing OCD-related functional impairment. Finally, given that co-occurring depression is often observed to dampen motivation in treatment, it may be necessary to augment or restructure standard behavioral reward systems. Clearly there is much to be done in this area and the field is ripe for further research on the treatment of comorbid subgroups.

The present study also examined demographic and clinical correlates of co-occurring depressive symptoms that may be used to guide future intervention and prevention efforts. Consistent with research indicating that risk for depression increases with age, we found that age was positively associated with higher rates of depressive symptomatology. Although this finding may reflect developmental trends towards increased depression with age, given the similar age effects found in the adult OCD literature (Angst & Dobler-Mikola, 1985; Millet et al., 2004; Tukul et al., 2006) it may also be the case that the challenge of contending with OCD takes its toll over time, thereby creating risk for subsequent depression. Certainly, severity of

depressive symptomatology was associated with higher levels of obsessions, compulsions, and overall OCD symptom severity, a finding that also converges with the adult literature (Besiroglu et al., 2007; Hong et al., 2004; Tukul et al., 2006), and points to the substantial burden of disease faced by these youth. Although longitudinal work with samples of adults with OCD makes a strong case for depression emerging secondary to the strain imposed by severe OC symptoms (Besiroglu et al., 2007), parallel work with children and adolescents is needed.

The present study also examined the relationship of co-occurring depressive symptoms to specific cognitive distortions. There was strong support for the hypothesis that depressive symptoms would be linked to lower levels of perceived control, with both continuous and categorical analyses of the CDI indicating that greater depressive symptomatology was linked to lower scores on all three indices of Weisz's (1992, 2001) Contingency Competence Control model. This finding provides further support for the specificity of the CCC model in predicting depression (Weisz et al., 2001) and it sheds light on potential mechanisms by which depression may emerge for children and adolescents with OCD. It may be the case that youth who feel particularly ineffective at controlling their OC symptoms or who take the persistence of symptoms in the face of their efforts to resist them as a reflection of their incompetence are at greater risk for subsequent depression. Alternatively, youngsters with low levels of perceived control may be less apt to attempt to resist OC urges thus maintaining and escalating the OCD cycle. Of course, these features may simply be related to depression irrespective of OCD status and longitudinal work with depressed-only control groups is needed to parse these possibilities. Interestingly, continuous analyses revealed links between the CDI and low insight into OCD, and there was also a trend toward group differences when examined categorically. Insight is not required for a diagnosis of childhood OCD, and this finding merits further investigation, particularly given that it diverges with the adult literature (Abramowitz et al., 2007; Besiroglu et al., 2007). Certainly, the limited measurement of insight in this study constrains interpretation of this trend.

Several other study limitations are noteworthy. First, cross-sectional methodology and the absence of a depression-only control group limits interpretation of study findings, particularly with respect to understanding how depressive symptomatology may unfold over time. Second, although the relatively large sample size can be considered a study strength, we note that participants were primarily Caucasian which may limit generalization of study findings. Generalization may also be limited by the fact that this sample was comprised entirely of youth with primary OCD. As youth with co-primary or primary MDD were excluded, the present findings may not extend to the full range of youngsters with OCD and depression. Third, measurement of OC-specific cognitions was limited and future work will need to more rigorously assess insight and other distorted cognitions thought to be central to OCD (e.g., thought-action fusion). Fourth, both depressive symptoms and cognitive variables were based on youth self-report raising concerns about method variance. Although youth are likely to be the most reliable informants for both depressive symptoms (Martin et al., 2004; Yeh & Weisz, 2001) and distorted cognitions, future studies employing multi-informant, multi-method designs will be necessary to assess these features more rigorously. Finally, depressive status was based on youth self-report on the CDI rather than on DSM-IV-guided diagnostic interviews (e.g., the ADIS-IV) and we found substantial disparity between rates derived from the two instruments. This may reflect the use of a sample that was designed to be medication-free at study entry as well as the screening and exclusion of youth with more severe (i.e., primary or co-primary) depression at study entry. It may also reflect the fact that the ADIS-IV is a more stringent instrument in terms of its evaluation of timing, duration, and intensity of symptoms compared to self-report measures. At the same time, it raises questions regarding the comparability of our findings to those in the adult literature and it constrains generalization of these findings to youth who meet full DSM-IV criteria for both OCD and MDD.

Along similar lines, controversy remains regarding the specificity of the CDI and some have suggested that it is more a measure of broad negative affect than specific depressive symptoms (Lonigan, Carey, & Finch, 1994). Although good discriminant validity with the CY-BOCS has been reported (Gallant et al., 2008; Scahill et al., 1997) and efforts were made to control for OCD symptom severity where possible, the possibility of CDI measurement error must be acknowledged. These concerns notwithstanding, the CDI remains the most widely used measure of child and adolescent depression (Brooks & Kutcher, 2001; Klein et al., 2005) and has been used extensively in studies of depressive symptomatology (Cole et al., 1998; Kazdin, 1989; Weisz et al., 2001). The levels of depressive symptomatology observed in the current study may more accurately reflect those seen in outpatient youth OCD samples. In addition, the fact that most of the findings we predicted were actually observed in this less acutely depressed sample argues for the robustness of these relationships.

Implications for Research, Policy, and Practice

Despite these weaknesses, the present investigation is among the first to document key clinical and cognitive features associated with depressive symptoms in youth with OCD. Understanding of developmental processes that may set the stage for depression among youth with OCD is of paramount importance given the many risks that accrue to depressed children and adolescents as well as the high rates of MDD among adults with OCD. Indeed, although some have suggested that comorbid MDD is not linked to adverse prognosis for OCD (and may in fact be treated indirectly by treating OCD) (Demal et al., 1993; Zitterl et al., 2000), others have found the presence of co-occurring MDD to diminish the effects of exposure-based treatment (Abramowitz & Foa, 2000; Storch et al., 2008). The present findings highlight the importance of carefully attending to depressive symptoms as part of the assessment process for youngsters with OCD. Moreover, they point to specific distorted cognitions that may warrant attention during the treatment process given that they account for a large proportion of the variance in depressive symptomatology. Future longitudinal work is needed to untangle the processes by which these cognitive variables interact with depression.

Acknowledgments

This research was supported by NIMH grant R01 MH58549 to John Piacentini and a NARSAD Young Investigator Award to Tara Peris.

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Table 1

Descriptive Statistics

Measure	Full Sample N=71	OCD N=51	OCD + Dep N=20
Child Age	12.17 (2.48)	11.60 (2.16)	13.74 (2.66) **
Gender (% Male)	62%	60%	80%
CY-BOCS Total Score	24.87 (4.67)	23.67 (3.95)	28.16 (5.03) ***
Obsessions	11.83 (2.47)	11.21 (2.28)	13.53 (2.20) ***
Compulsions	13.04 (2.80)	12.46 (2.43)	14.63 (3.17) **
CDI	8.53 (7.34)	4.92 (3.11)	18.21 (6.84) ***
Perceived Competence (SPPC)	109.03 (16.92)	114.50	92.63 (16.02) ***
Perceived Contingency	94.93 (13.27)	97.73 (13.00)	87.26 (11.01) **
Perceived Control	83.81 (11.44)	86.94 (8.09)	74.77 (15.01) ***
Insight into OCD Symptoms	.97 (.95)	.88 (.90)	1.26 (1.04)

Note. CY-BOCS = Children's Yale-Brown Obsessive Compulsive Scale; CDI= Children's Depression Inventory; SPPC= Self-Perception Profile for Children. Results of t-tests for group differences:

**
 $p < .01$,

 $p < .001$

Table 2

Bivariate Correlations among Study Measures

	1	2	3	4	5	6	7	8	9	10	11
1. Child CDI	1										
2. Age	.29*	1									
3. Gender	-.12	-.12	1								
4. Ethnicity	.17	.21	-.10	1							
5. CY-BOCS Obsessions	.43**	.14	.03	-.05	1						
6. CY-BOCS Compulsions	.38**	.02	.26*	.02	.58**	1					
7. CY-BOCS Total	.45**	.09	.17	-.01	.87**	.90**	1				
8. Perceived Contingencies	-.38**	-.37**	-.02	-.01	-.20	-.10	-.12	1			
9. Perceived Competence (SPPC)	-.67**	-.16	-.08	-.02	-.28*	-.25*	-.29*	.34*	1		
10. Perceived Control	-.69**	-.17	-.12	-.13	-.33*	-.35*	-.38*	.54**	.66**	1	
11. Insight	.28*	-.18	-.23	-.17	.14	.03	.09	-.08	-.09	-.25*	1

Note. Ethnicity was examined as a categorical variable (Caucasian/non-Caucasian). CDI= Children's Depression Inventory. CY-BOCS= Children's Yale-Brown Obsessive Compulsive Scale. SPPC= Self-Perception Profile for Children n= 71.

* $p < .05$.

** $p < .01$.

Table 3
 Bivariate Correlations between Youth Self-Report of Depressive Symptoms and CY-BOCS Symptom Clusters

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Child CDI	1																
2. Contamination (o)	.13	1															
3. Aggressive (o)	.16	.24	1														
4. Sexual (o)	.19	-.16	.34	1													
5. Hoarding (o)	.16	.38	-.03	-.19	1												
6. Superstitious (o)	.14	-.09	.32	.10	-.08	1											
7. Somatic (o)	.21	.03	.18	.13	.12	-.02	1										
8. Religious (o)	.09	.29	.46	.30	.09	.33	.08	1									
9. Misc. (o)	.17	-.04	.12	-.01	.09	.10	.28	-.07	1								
10. Cleaning (c)	.12	.66	-.02	-. 26	.28	-.08	.00	.17	-. 25	1							
11. Checking (c)	.19	.44	.39	-.11	.32	.14	.06	.23	.08	.26	1						
12. Repeating (c)	.20	.17	.13	-.13	.07	.16	-. 26	.15	-.10	.14	.24	1					
13. Counting (c)	.29	.13	.29	-.17	.10	.13	.17	.07	.08	.10	.46	.31	1				
14. Ordering (c)	.03	.07	-.04	-.22	.17	-.13	.05	-.07	.19	.02	-.07	.13	.10	1			
15. Hoarding (c)	.09	.08	.05	-.11	.36	-.08	-.10	-.06	.04	-.11	.09	.12	.23	.14	1		
16. Superstitious (c)	.18	.09	.04	-.20	-.11	.11	.19	-.03	.09	-.09	.07	.12	.33	.03	.28	1	
17. Other (c)	.03	.09	.25	.00	-.10	-.13	-.08	.12	-.08	.05	.18	-.07	-.01	.00	-.17	-.05	1

Note. CDI= Children's Depression Inventory. (o) refers to obsessions and (c) refers to compulsions categories derived from the Children's Yale-Brown Obsessive Compulsive Scale. Significant correlations ($p < .05$) are shown in bold.

Table 4
Results of Hierarchical Regression Analyses Predicting Co-Occurring Depressive Symptoms

	Standardized β	R^2	ΔR^2	ΔF (df)	p
Model 1:					
Youth age	.29	.09	--	6.49 (1, 69)	.01
Model 2:					
Youth age	.26				.02
CY-BOCS Total Severity	.43	.27	.19	17.21 (1, 68)	.00
Model 3:					
Youth age	.18				.03
CY-BOCS Total Severity	.27				.00
Perceived Competence (SPPC)	-.56	.55	.28	41.26 (1, 67)	.00
Model 4:					
Youth age	.15				.10
CY-BOCS Total Severity	.27				.00
Perceived Competence (SPPC)	-.53				.00
Perceived Contingencies	-.10	.56	.00	1.12 (1, 66)	.29
Model 5:					
Youth age	.17				.04
CY-BOCS Total Severity	.20				.02
Perceived Competence (SPPC)	-.34				.00
Perceived Contingencies	.05				.64
Perceived Control	-.39	.62	.06	10.86 (1, 65)	.00

Note. Standardized β for significant predictors ($p < .05$) are shown in bold. CY-BOCS = Children's Yale-Brown Obsessive Compulsive Scale, SPPC= Self-Perception Profile for Children