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Categorical and dimensional aspects of co-morbidity in Obsessive-Compulsive Disorder  
(OCD)

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**Abstract**

Objective: Obsessive-Compulsive Disorder (OCD) defined at the diagnostic level encompasses divergent symptoms and is often associated with other psychiatric problems.

The present study examines OCD versus co-morbid symptom patterns in OCD in children and adolescents in order to investigate the presence of diagnostic heterogeneity

Subjects and methods: One-hundred and thirteen outpatients with primary OCD participated.

The patients' and primary caretakers' responses on semi-structured interviews (child version of Schedule for Affective Disorders and Schizophrenia and the Children's Yale-Brown Obsessive Compulsive Scale) and parents' responses on the Child Behaviour Checklist were used in the study. Psychiatric diagnoses were related to CBCL syndrome scores and CBCL scores were compared with the Swedish normative data.

Results: Co-morbid diagnoses were very common and only one out of five patients had only OCD. The most common group was the neuropsychiatric disorders (47%) where tic disorders were most common (27%), especially among boys (40.8%;  $p = .006$ , Fisher's exact test). Also anxiety disorders were common (39.8%) as were affective disorders (24.8%) neither with any gender differences. Diagnoses of disruptive disorders were less common (8.8%), almost exclusively of the oppositional kind (ODD) (8.8%). From the dimensional point of view using the CBCL, patients with OCD scored higher than Swedish youngster generally do, and some gender differences were seen in that girls scored higher on anxiety and depression while both girls and boys had high scores on thought problems, attention problems and especially aggressive behaviour. Comorbidities explained from 25-50% of the CBCL sub-syndrome scales, often with both main effects and through complex patterns of interaction with gender, OCD-severity and other co-morbid problems.

Conclusions: While co-morbid problems is an important facet of OCD, sub-syndromal levels of symptoms that can be assessed using a dimensional approach, is a large part of the total symptom burden in these youngsters. Our data indicate contributions of different pathways for girls and for boys for several comorbid problems together with OCD-severity.

Keywords: Obsessive-compulsive disorder, outpatients, co-morbidity, categorical assessment, dimensional assessment, CBCL

## **1 Introduction**

### **1.1 OCD**

OCD is a not uncommon disorder among children and adolescents (23), has often a chronic course (43) and shows a fair amount of heterogeneity (29;37). The definition of OCD as a unitary phenomenon in the DSM IV (4) rests on the presence of various obsessive and/or compulsive symptoms. However, these symptoms are remarkably diverse in character, ranging from obsessional worries about dirt and bacilli to fears of having done something terrible or blasphemous. Examples of compulsions vary from washing or checking rituals, to touching rituals devoid of cognitive content, or to mental rituals where some thoughts are intended to neutralize fears. OCD patients also differ in personality characteristics, associated problems, family backgrounds and ability to profit from treatment.

The heterogeneity of OCD symptoms has been studied with regard to different aspects of the syndrome itself, e.g. symptom pattern or clustering (9;33), temperamental factors (28) and patterns of co-morbidity (11-13;18;22). Recently, the biological heterogeneity found in etiological factors has aroused the interest of investigators (19;39;42) one type being endophenotypes (e.g. association between symptom patterns and brain functioning (36;41). Other important area of OCD heterogeneity concerns differential response to drug and psychological treatment. Two studies have reported differential lack of response for the hoarding OCD subtype (1;35). Understanding the sources of non-optimal treatment response is of importance in view of the chronic course many OCD-patients encounter (43). McKay (37) recently published a review of the heterogeneity issue.

1.2 Differential symptom patterns in OCD: Using PCA factor analysis or cluster analysis to establish sub-groupings based on the symptom patterns, adult samples have found some specific patterns, e.g. such as “Obsessions and Checking”, “Symmetry and Ordering”,

“Cleanliness and Washing” and of “Hoarding” (5;9;33) In a child study we identified five sub-groups that were similar though not identical to the Leckman findings: “Contamination and Cleaning”, “Obsessions, Checking and Confessing”, “Superstitious”, “Somatic Concerns”, and “Mental Rituals, Touching&Ordering” using cluster analysis (29). A paediatric factor analytic study (37) showed a less coherent picture.

1.3. Personality dimensions or temperament has been studied in more adult than child- or adolescent samples. Generally the studies have found OCD-patients to be inhibited and cautious, i.e. not risk-taking (6;17;34). However, investigating possible temperamental heterogeneity, we found that OCD-patients come in two temperamental sub-types (28), one type showing the expected inhibited and cautious temperament, while the other type showed an overemotional, reactive temperament, similarly to findings in depression (16).

1.4. One source of heterogeneity is the remarkably diverse patterns of co-morbidity in OCD. Most studies have found that less than one in four OCD-patients are free from co-morbidity. While one might properly expect that many had co-morbid anxieties, findings have also been that developmental disorders such as ADHD, autism spectrum problems and learning difficulties are frequent (13). Moreover, affective disorders are frequent as well. A well replicated finding across the years, that of the association between OCD and tics/Tourette’s syndrome has also the interesting facet that it seems to affect the OCD phenotype itself, increasing the level of aggressive obsessions (21).

To summarize, the study of heterogeneity in OCD across different ages is important in that it might “elucidate etiologic processes” (37), e.g. to produce more homogeneous groups for genetic studies, to delineate differences in treatment response, but also to test the proposal that OCD in children and adolescents might be developmentally distinct from, or have specific traits compared with adult OCD (30).

### **1.3 Aims**

The aim of the present study was to study the presence of OCD heterogeneity/sub-groupings in childhood OCD by an analysis of the co-morbidity patterns using a combined categorical and dimensional approach.

## **2 Method**

### **2.1 Subjects**

The study group has two origins, one originating from the first assessment and treatment clinic for OCD that the first author started at an outpatient unit in Gothenburg in 1991, and the second all patients that were assessed and treated at the specialized OCD-unit that was started by the first and second authors in 2001. The first group (non-specialized or NS group) was a total of 121 patients, children (4-11 years) (n=34; 15 girls and 19 boys) and adolescents (12-17 years) (n=87; 28 girls and 59 boys) while the sub-specialized (SS group) was a total of 113 children (n=47; 23 girls and 24 boys) and adolescents (n=66; 41 girls and 25 boys). The differences between the NS and SS groups fell short of statistical significance. Most patients had intact families (70.4%), with no differences across the two groups. Moreover, patients were most often of Swedish ethnicity with 7% of our patients having one parent and 12% having both parents of non-Swedish ethnicity. However, the socio-economic status of our patients did not differ due to ethnicity, both (5.76 and 6.05) being relatively close to the mean SES we found in a recent population based study (evaluating an anxiety scale) (27).

There were no significant age differences (the NS group had a mean age of 12.7 years and the SS group 13.1 years) (n.s.). Patients were included in the study based on informed consent.

Ethics committee approved. Thirty-eight individuals did not fulfill the criteria for inclusion, and an additional 19 individuals (7 girls and 12 boys) who were eligible for the study, declined to participate.

## 2.2 Measure of OCD symptoms

OCD symptoms among patients were diagnosed using the DSM-IV criteria (4) based on information gathered during the diagnostic work-up, which included the Children's Yale-Brown Obsessive-Compulsive Scale (CYBOCS), a parent-, and child interview that yields all information needed for a DSM diagnosis of OCD. The first author diagnosed all participants based on all available information (see below).

The CYBOCS is a semi-structured interview containing checklists of obsessions and compulsions. Scales assessing the severity of obsessions and compulsions separately (range 0-20) are added to a CYBOCS total score (range 0-40). Furthermore, lack of insight, avoidance, indecisiveness, inertia and pathological doubt can be gauged using scores ranging from 0 to 4. Finally, a global severity score is assigned based on all information gathered during the interview. This includes behaviours, such as high "avoidance", that tend to lower compulsion sub-scores and other OCD behaviours, such as "inertia" that contribute to OCD severity without necessarily elevating the obsessions or compulsions sub-scores. The checklists and the severity ratings were based on interviews with each child and each parent/adult informant.

The diagnostic work up also included clinical interviews and the use of other rating instruments (Depression Self-Rating Scale or Children's Depression Inventory (CDI), and the Achenbach Child Behaviour Check List (CBCL). About half of the patients, i.e. those in the SS-sample (n= 113) were interviewed using the Kiddie Schedule for Affective Disorders and Schizophrenia-Present state and Lifetime version (KSADS-PL) (31). Co-morbid diagnoses in the NS-sample (before 2001) were based on clinical interviews supported by the use of rating scales (see above) and psychological assessment (including the Wechsler Intelligence for Children). Thus, the clinical interview was reasonably systematic, especially with regard to important differential diagnoses and common co-morbidities (e.g. separation anxiety, tics, depression, ADHD and for example oppositional defiant disorder). Although less reliably



diagnosed than in the later sample, we believe that major co-morbidities and possible differential diagnoses were detected. In all, 71.5% of the cases in the NS sample had one or more co-morbid diagnoses. These will not be reported, nor used for the study of categorical diagnoses, or as predictors of dimensional symptoms assessed using the CBCL, as we do not consider that the reliability of less impairing and prominent symptoms and syndromes can be ensured. Also, as the CBCL was used as a diagnostic aid before the KSADS was used, prediction using the clinical diagnoses would have involved a circular process. In cases where autistic traits or disorders were suspected, a neuropsychiatric assessment supplemented with validated parental rating scales (7;10).

Patients with a primary diagnosis of mental retardation, psychotic disorders, anorexia nervosa and pervasive developmental disorder were excluded from participation. Patients with co-morbid depressive disorders were included if OCD was the primary disorder. The two samples differed in that the NS-sample had significantly lower CYBOCS total scores ( $m=20.4$ ,  $SD=6.78$ ) compared to the SS-sample ( $m=22.9$ ,  $SD=6.12$ ,  $p=.01$ ) ( $t(222)=-2.86$ ,  $p=.005$ ). The sample included all cases that fulfilled criteria for OCD according to the DSM-IV regardless of severity as expressed through the CYBOCS scores.

The study combines a categorical diagnostic approach (4) with a dimensional approach using the Child Behaviour Checklist (CBCL) (2). The latter approach has advantages with regard to problems that are frequent both in more and in less serious forms so that a continuous distribution is closer to the truth than the dichotomic either/or of a categorical system. Thus, co-morbid problems like oppositionality/aggression or anxiety/depressed are better described through a scale score, i.e. the scale picks up the full variation of the problem, rather than just the dichotomic presence/absence of it. The CBCL is an empirical based scale that covers 113 different child psychiatric symptoms as either not present, present in a mild form or seldom, or as definitely or often present. Apart for a total score, the CBCL allows for sub-scales and

syndrome scales named the “Internalising” and an “Externalising” dimension, “Withdrawal/depressed”, “Anxiety/depressed”, “Somatic problems”, “Thought problems”, “Attention difficulties”, “Aggressive behaviour”, “Delinquency” and “Other problems”.

Moreover, the CBCL covers social competence from several areas, home, friends, school and activities. The Swedish translation of the CBCL has been studied psychometrically and norms are published (32) and used in the comparisons.

## **2.3 Statistical methods**

Scores on the CBCL were quantified in accordance with the 1991 CBCL profile (2).

Following the modification of the CBCL in 2002, where some items were exchanged and scales for DSM ADHD, depression, ODD, CD were introduced, we have made the versions compatible, using similar items and the SPSS missing values function when appropriate. We used univariate analyses of variance (ANOVA) and Student’s t-tests, to test group differences for continuous data. A stepwise approach was used to investigate which predictors (e.g. gender, age and psychiatric diagnoses) were most important. The fully factorial ANOVA model was broken down stepwise in the least significant predictor was taken out of the model. Only remaining significant predictors are reported. When t-tests was used comparing our patients with those from published normative data (32) a web-based calculator was used (<http://graphpad.com/quickcalcs/ttest2.cfm>). Chi square analysis was used for categorical data.

## **3 Results**

### **3.1 Gender**

There were a few gender differences as regards co-morbidity (Table 1). Boys more had elevated levels of neuropsychiatric forms of co-morbidity with regard to tics and ADHD and girls had more often GAD. There were no gender differences with regard to number of co-morbid diagnoses.

Table 1 about here

### 3.0.2 Age differences

Children and adolescents did not differ to any greater extent with regard to tic disorders.

However, oppositionality was more common in children as was separation anxiety, though the latter fell short of statistical significance.

### 3.1.2 Dimensional symptom patterns

We studied the pattern of co-morbidity through the CBCL parent ratings (n=204). The figures below depict mean together with 95% confidence intervals for the different CBCL sub-scales and dimensions. These are compared in one-sample t-tests with the corresponding norms for Swedish CBCL (n=1308) (32). Also, we compare with OCD patients (from the SS sub-sample) using co-morbid diagnoses of relevance as predictors for some of the scales of special interest (Withdrawal/depressed, Anxiety/depressed, Thought problems, Attention problems and Aggressive behaviour) in question using GLM ANOVAs. Thus the advantages of the CBCL dimensional constructs can be gauged. Table 2 shows the correlation between these scales and the CYBOCS Total score and Clinical Global Severity, which might indicate how “independent” the problems assessed through these scales might be vis-à-vis the OCD and versus the influence of the categorical diagnoses.

Table 2 about here

Scales with symptoms of a depressive and anxious kind were significantly correlated with OCD severity. Also, the scale Thought problems that contains the OCD items (but also

psychotic-like symptoms) of the CBCL, was correlated with the CYBOCS scores, while scales with aggressive symptoms and attention problems were uncorrelated with OCD severity. Both CBCL total score and the internalising dimension were correlated with OCD severity. Two measures of OCD severity were used, the CYBOCS total score and the Clinical Global Impression (CGI). The CGI can accommodate both OCD severity that is associated directly with the obsessions and the compulsions (just as the CYBOCS total score does) but also other OCD phenomena that contribute to OCD severity like avoidance, inertia or pathological doubt. The severity measure that had the highest correlation was used in the following ANOVA analyses that attempt to separate the contributions to CBCL symptom levels that come from OCD severity and what comes from comorbidities and from gender and age.

The OCD cases scored higher than the Swedish normative sample on Withdrawn/depressed ( $M=3.8$ ,  $SD=3.1$  versus  $m=1.2$ ,  $SD=1.5$ :  $(t(1520)=19.5, p=.0001)$ ), Anxious/depressed ( $M=9.9$ ,  $SD=6.2$  versus  $m=1.9$ ,  $SD=2.6$ :  $(t(1520)=32.4, p=.0001)$ ) as well as Somatic symptoms ( $M=2.6$ ,  $SD=2.6$  versus  $m=1.0$ ,  $SD=1.5$ :  $(t(1520)=12.8, p=.0001)$ ) (comparison statistics from (32)).

Figure 1 about here

Using GLM ANOVA, to predict CBCL Withdrawal scores, OCD severity ( $F(1,98)=9.5, p=.003$ ), gender  $F(1,98)=5.7, p=.02$ ), gender by any ASD  $F(2,98)=10.9, p=.0001$ ) indicating that girls and boys has same scores except for girls with autism spectrum disorder who scored about twice as high, and gender by Anx by any depressive disorder  $F(6,98)=2.9, p=.013$ ).

The latter interaction entailed that girls with a comorbid anxiety disorder who weren't depressed scored lower than the other girls and that boys who neither had comorbid anxieties

nor depression scored low, else high. The full model was significant ( $F(10,88)=5.35$ ,  $p=.0001$ ), explaining about 38% of the variance.

The CBCL Anxiety/depressed scores were predicted by any comorbid anxiety disorder (Anx) ( $F(1,98)=7.4$ ,  $p=.0001$ ), any depressive disorder ( $F(1,98)=7.9$ ,  $p=.008$ ) and gender by Anx interaction, i.e. boys had high scores only in the presence of comorbid anxiety disorders, otherwise low, while girls had high scores regardless of comorbid anxieties.

OCD-patients had much higher scores on Thought problems than the Swedish Normative sample ( $M=5.5$ ,  $SD=3.4$  versus  $m=0.1$ ,  $SD=0.5$ : ( $t(1520)=54.1$ ,  $p=.0001$ ), as well on Attention problems ( $M=5.3$ ,  $SD=4.2$  versus  $m=1.6$ ,  $SD=2.1$ : ( $t(1520)=20.0$ ,  $p=.0001$ ), and on Social problems ( $M=2.6$ ,  $SD=2.6$  versus  $m=0.7$ ,  $SD=1.3$ : ( $t(1520)=16.6$ ,  $p=.0001$ ).

Figure 2 about here

Neither gender nor age predicted Thought problems scores, only OCD severity ( $F(1,94)=9.9$ ,  $p=.002$ ) and the presence of any tic/Tourette's disorder ( $F(1,94)=5.0$ ,  $p=.028$ ). The full model was significant ( $F(2,94)=7.1$ ,  $p=.001$ ), explaining though, a small amount (13%) of the variation.

The severity of attention problems in our patients was associated with comorbid ADHD ( $F(1,98)=13.1$ ,  $p=.0001$ ). However, other neuropsychiatric comorbidities were also of importance, like any ASD disorder ( $F(1,98)=5.9$ ,  $p=.017$ ) which was important as well in interaction with OCD severity, i.e. ASD by CGI ( $F(1,98)=4.8$ ,  $p=.032$ ), or any tic disorder by gender and CGI ( $F(3,98)=5.6$ ,  $p=.001$ ). The full model was significant ( $F(7,91)=6.4$ ,  $p=.0001$ ) explaining 32.8% of the variation.

Table 3 about here

In spite of OCD-patients having very low scores on Delinquency, they scored higher than the Swedish normative group ( $M=1.8$ ,  $SD=2.6$  versus  $m=1.1$ ,  $SD=1.5$ :  $t(1520)=5.6$ ,  $p=.0001$ ).

However, OCD-patients had very much higher aggressive behaviour scores ( $M=8.7$ ,  $SD=7.3$  versus  $m=4.5$ ,  $SD=4.4$ :  $t(1520)=11.6$ ,  $p=.0001$ ). With regard to aggressive behaviours, 23% of the OCD-patients had scores that put them in the clinical range (Scores of 14 or above that are present in less than 5% of normal pre-pubertal boys. However, few received a diagnosis of ODD or conduct disorder (Table 1) and, if included in an ANOVA model, the term did not reach statistical significance. Instead, a complex pattern of neuropsychiatric comorbidity (Any tics/Tourette disorder ( $F(1,98)=9.6$ ,  $p=.003$ ); any ADHD disorder ( $F(1,98)=6.9$ ,  $p=.01$ ); any ASD disorder ( $F(1,98)=8.2$ ,  $p=.005$ )), all three of which were associated with higher aggression scores, and interaction effects between gender and anxiety disorders ( $F(2,98)=5.7$ ,  $p=.005$ ), indicating that in males but not females, comorbid anxiety disorders was associated with higher aggression scores. We also found an interaction between gender and ADHD ( $F(1,98)=4.4$ ,  $p=.039$ ), entailing that in girls with ADHD aggression scores were high while boys scores were not affected by comorbid ADHD. Moreover, interaction effects between any tic disorder by any ASD ( $F(1,98)=6.9$ ,  $p=.01$ ) occurred in that if ASD and tic disorders occurred together, aggression scores were very high. Also interaction was present between age group and global severity ( $F(1,98)=4.8$ ,  $p=.001$ ) as was interaction between these two terms and comorbid ADHD ( $F(1,98)=7.5$ ,  $p=.008$ ). Finally, an interaction between ADHD and global severity ( $F(1,98)=6.4$ ,  $p=.013$ ) was seen. In all, 26% of the variation was explained in a significant model ( $F(12,86)=2.5$ ,  $p=.006$ ).

The Externalising and Internalising dimensions as well as the total score followed the same pattern in that the OCD patients scored higher than the Swedish normative group:

Externalising (M=10.1, SD=8.8 versus m=5.6, SD=5.4: (t(1520)=10.2, p= .0001);

Internalising (M=14.6, SD=9.4 versus m=4.0, SD=4.3: (t(1520)=27.0, p= .0001); and Total score (M=42.3, SD=23.9 versus m=14.3, SD=12.6: (t(1520)=25.8, p= .0001).

Figure 4 about here

The internalising dimension was predicted by many factors, both single predictors (like disruptive disorders that was associated with lower scores (F(1,98)=25.3, p= .013) and eating disorders that were associated with higher scores (F(1,98)=9.3, p= .003). Furthermore, there was an intricate pattern of interaction between gender, age and most co-morbid problems including OCD severity, e.g. gender and disruptive disorders and age and tic disorders. The full model was significant (F(27,71)=4.4, p= .0001) and explained almost 63% of the variance. The figures and F-values are available from the author for interested readers. As the externalising dimension consists of oppositionality plus delinquency and most of this variation was due to aggressive behaviour, these data are excluded.

With regard to the CBCL total scores, which include all 113 problem items, including some that are part of the scale “Other problems” not mentioned above, this is the most comprehensive measure of problems expressed as continuous data (range 1-216). The full model was significant (F(14, 84)=6.1, p= .0001), explaining 50.4% of the total variance.

Comorbid neuropsychiatric disorders like any tics/Tourette (t/T) syndrome (F(1, 98)=14.1, p= .0001), any co-morbid ADHD (F(1, 98)=6.1, p= .016), any co-morbid ASD (F(1, 98)=12.8, p= .001) had main effects by themselves. However, they also influenced CBCL total scores

levels through interaction with other factors like gender and OCD global severity, as well as age and within themselves. Also, any anxiety (Anx) disorder contributed. The interaction pattern was: (1) gender by any tic disorder ( $F(1, 98)=5.0, p=.028$ ), where a t/T disorder was associated with high scores regardless of gender while without a t/T disorder boys scored higher than girls; (2) gender by Anx ( $F(2, 98)=10.5, p=.0001$ ), where boys with Anx scored high, otherwise lower compared to girls whose scores were little influenced by Anx; gender by ADHD ( $F(1, 98)=4.6, p=.034$ ), where boys with ADHD scored high, otherwise lower, comparably to girls whose scores did not differ much by ADHD; any t/T by ASD ( $F(1, 98)=7.6, p=.007$ ), where the combination was associated with very high levels otherwise at roughly similar levels. However, OCD global severity was also important in interaction with: (1) age group ( $F(1, 98)=15.7, p=.0001$ ), where CBCL scores increased more for adolescents than for children for every increment in OCD severity; (2) ADHD ( $F(1, 98)=15.7, p=.0001$ ), where the presence of ADHD led to a greater increase of CBCL total score for every increment in OCD severity; (3) ASD ( $F(1, 98)=4.9, p=.052$ ), where the presence of an ASD led to a decrease in CBCL total score for every increment of OCD severity. Finally, ADHD by age influenced the way OCD global severity influenced CBCL total scores. Without ADHD, age had no influence, but in the presence of ADHD older age increased CBCL scores by every increment in OCD severity ( $F(1, 98)=16.1, p=.0001$ ).

#### 4. Discussion

##### Synopsis

Our main finding is that the burden of co-morbidity in OCD-patients is high, whether assessed through categorical diagnoses or through dimensional measures. Slightly less than half of our subjects had a neuropsychiatric co-morbidity (tics/Tourette's, ADHD or autism spectrum problems). Apart from these problems many cases had other anxiety disorders, several of



multiple kinds, or affective disorders that are clearly more common in OCD patients than in children and adolescents generally. However, it is also clear that “below” the level defined by categorical diagnoses, important levels of symptoms are present as well, whether these are anxieties, depressive feelings and cognitions, attention problems or aggressive behaviours and that these symptoms are revealed through the dimensional constructs in the CBCL. The comparison with Swedish normative data (32) indicate much higher levels of all kinds of problems. This is especially the case with regard to depressive, anxious and aggressive behaviour. The level of these CBCL problem levels were partly, but not fully explained by OCD severity or co-morbid disorders. For example, very few of our patients received a diagnosis of either Oppositional defiant disorder or conduct disorder. We believe that these levels of aggressive behaviours that are not part of a separate co-morbid syndrome still might be an important determinant of outcome. Also, the CBCL total score, as were many of the sub-syndrome scores, seems to be influenced to a great extent by neuropsychiatric comorbidities, both as main effects but also through various interaction effects (e.g. gender and OCD severity). Tics have few CBCL items and ASD none and thus their influence is way out of proportion to their own contribution to CBCL scores. Our results indicate that these problems are important markers of CNS dysfunction in OCD. Similarly, attention problems have several items in the CBCL, but its influence on CBCL scores is large and goes beyond the ADHD symptom domains.

### Main findings

Our findings are in line with those of other investigators in that the high prevalence of other psychiatric disorder (77%) that we found have been noted before (11;20;40). However, our rates for specific disorders are in several instances lower than those that other investigators have published (ours in italics), as exemplified by findings from Geller (11) major depression (68%; *16%*), Bipolar disorder (17%; *1%*), ADHD (44%; *9%*), ODD (43%; *8%*), and within

the anxiety disorder spectrum Panic disorder (20%; 2%), and Separation Anxiety disorder (43%; 4%). However, with regard to other disorders, differences were smaller e.g. social phobia (10%; 6%), specific phobia (27%; 26%), conduct disorder (6%; 1%) and Tourette's syndrome (DSM IV) (17%; 9%) The discrepancies can partly be explained on the basis of the different kinds of unit, whether secondary (as our current unit) or tertiary "super specialised" unit). However, the discrepancies are so great that other factors might also be operative. In our clinic, the first author (who is highly experienced in OCD clinical work) was responsible for most diagnostic assessments and was especially concerned that disruptive behaviour that was motivated by OCD anxieties not be counted as ODD, nor that attention difficulties due to obsessions were counted as ADHD symptoms, or that aggressive obsessions concerning danger to the parents were seen as separation anxiety etc. It might be, that having less resources with regard to research assistants and interns, and reliance on senior physicians for diagnostic interviewing, diagnostic procedures might produce lower, and possibly more reliable estimates.

Using the dimensional approach with the CBCL enables us to assess many of these dimensions not as discrete entities that either is there or not, but as continuous representations of different important problem areas. Using the CBCL, we found high levels of depressive and anxiety symptoms, as well as attention difficulties. These were to a significant degree, but not fully explained by the comorbidities (depressive disorders, anxiety disorders and ADHD). With regard to CBCL Withdrawal/depressed, the symptoms that are encompassed are influenced both by OCD severity (where avoidance is usual and might contribute) as well as with clinical syndromes that include withdrawal, like depression, ASD and any anxiety disorder (where also avoidance is usual). CBCL Anxious/depressed encompasses both anxiety symptoms but also the cognitive symptoms in depression. It seems reasonable that these

levels mirror the same co-morbidities. One interpretation of the depressive symptoms that are not confined within a major depression is that the symptoms should be seen as a demoralisation syndrome and secondary to the stress and pain of living with a chronic serious and impairing disorder as was also described by Gittelman-Klein (15) in a now classical paper on school refusal.

Thought problems include symptoms of different kinds ranging from suicidality to OCD symptoms, skin-picking and sleep problems. The relationship with OCD severity seems straightforward enough. However, it seems unlikely that the tic item included in this sub-scale is solely responsible for the association between tics/Tourette and elevated Thought problems scores. As will be discussed below, any t/T syndrome seems out of proportion able to predict CBCL symptoms including the CBCL total score.

Attention difficulties too were predicted by neuropsychiatric comorbidities to a significant extent, not least ADHD. So, as Geller (12) pointed out, ADHD disorder in OCD is a real co-morbidity, and can be assessed using the CBCL scale. The contribution from ASD and t/T syndromes to attention difficulties as well as with OCD severity indicate to our minds that attention is a complex neuropsychological function that can be disturbed by different factors. It would be of great interest to see if different correlates of attention problems in OCD (i.e. ADHD, ASD, tics/Tourette and OCD severity above a certain level) have different neuropsychological profiles at tests.

CBCL Delinquency was low, but still higher in our OCD-patients than in the Swedish normative study (32). However, as only one subject was diagnosed as such we refrained from analysing predictors of this problem.

The high levels of aggressive behaviour the OCD patients showed were not explained to any significant part by DSM disorders that encompass aggression as a symptom (e.g. Oppositional Defiant and Conduct Disorder). If high levels of aggressive behaviour in OCD patients are not ODD, what then is it? The degree of aggressive behaviour was clearly influenced by other co-morbid problems in that anxiety disorder (other than the OCD) in girls was associated with low levels of aggressive behaviour. Presumably, in girls the developmental pathway leading to the combination of OCD and other anxieties are via the inhibited temperament, as seems to be the case in other anxiety disorders (8;24). However, this seems not to be the case in boys, where aggressive behaviour was higher in the presence of co-morbid anxiety disorders. This might imply that the inhibited temperament does not play the same role in boys with OCD and co-morbid anxieties. We also found that tic/Tourette's, ADHD and ASD independently were associated with higher aggressive behaviour as well as in interaction with other factors, presumably, one can speculate, because each of these conditions are associated with a lack of control. Thus, the different pathways leading patients with OCD to exhibit high levels of aggressive behaviour entail complex co-morbidities that interact among themselves and with gender. However, about 75% of the aggressive behaviour is not explained through the model.

One reason for the "unexplained" aggression might be that the high level of aggressive behaviour is in some ways intrinsic to the OCD. A reason for this might be that fight-flight reactions are hard-wired into the human brain (3) and although flight in the form of avoidance behaviour and security promoting behaviours (rituals) are core phenomena in the OCD, this does not preclude that aggressive responses, when avoiding and rituals are not enough to allay the anxiety, are part and parcel of the OCD responses. Treating that aggressive behaviour as ODD or conduct disorder would not enhance our treatment results. Rather, this level of aggressive behaviour indicates the need to target the OCD as effectively as possible, and to

work more on the motivation to participate in treatment. One way to better understand the importance of aggressive behaviour in OCD, is to use it as a predictor of outcome of treatment, as we will do in a naturalistic study of a 5-year cohort. However, we recognise that co-morbid ODD or conduct disorder when the problems are present, need to be addressed separately, as otherwise the CBT has a high risk of being ineffective. Lastly, it might be that our diagnostic policy has been too restrictive and that ODD might be under-diagnosed. Without a formal reliability analysis of our diagnoses, this issue still remains open.

In summary though, we feel that the CBCL subscales “Aggressive Behaviour”, “Attention Difficulties” and “Withdrawal/depressed, and “Anxiety/depressed” as well as the CBCL total score contribute important information about the impact on the individual of the OCD as well as important co-morbidities. Thus, the CBCL is a useful screening tool in OCD.

### Limitations

Our sample is reasonably large so that major co-morbidities ought to have been present. However, we still might have missed some types of co-morbidity that are of low prevalence, e.g. bipolar disorders or panic disorders and conduct disorders. Also, a study of the prevalence of various co-morbid disorders would need to study the reliability of the various diagnoses, something that needs to be done in the future.

### Conclusions

One important facet of the study is the importance of not relying solely on one source or method of assessments. Especially, we feel there is a need for both categorical and dimensional-continuous measures in the diagnostic work-up. Most agree about the importance of diagnoses as an aid in clinical decisions that by their nature are dichotomic, you either give

a treatment or you don't. However, adding a dimensional aspect picks up a greater part of the variance and might contribute to our understanding of OCD in a different way, for example one might hypothesize that high levels of aggressive behaviour in a child might be associated with high levels of family accommodation and thus lead to worse outcome in the long run. Thus exploring this association in the clinic and in future research is important. Generally the role of these diagnoses and the CBCL sub-scales need to be understood in a longitudinal perspective, as we intend to do through a 3-year naturalistic outcome study of a five consecutive year cohort of patients attending our clinic.

We also feel that it is probable that our patients have higher levels of autistic like symptoms that also are below the diagnostic threshold (although the CBCL does not measure any of these), and that a continuous scale assessment of these symptoms would be of great interest and determining of outcome as well (as aggressive behaviour and depression probably does). We intend to study this in the future using dimensional and categorical methodology.

Moreover, the use of the CBCL as a screen for OCD itself needs to be studied further (14;25;26;38;44) in the different languages and situations where the CBCL is used. This is a question of high priority for our group, especially in view of the usefulness within non-specialised child- and adolescent psychiatry with such a tool.

Finally, all the sources of OCD heterogeneity (temperament/personality, OCD symptom patterns, co-morbidity and genetics) needs to be "put together" in a study exploring these facets in the same patients. This might elucidate patterns that elude us when looking at the patients in separate studies which give a fragmented view of these issues.

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Table 1. Co-morbid diagnoses for girls and boys with OCD. P-values refer to (Fishers exact test)

	Girls (n=64) %	Boys (n=49) %	p	Child- ren (n=47) %	Adoles- cents (n=66) %	p
<b>Neuropsychiatric Disorders (any)</b>	29.7	57.1	.004	40.4	42.4	n.s.
Tourette's (DSM IV)	6.3	12.2	n.s.	6.4	10.6	n.s.
Tourette's (DSM III + IV)	10.9	28.6	.027	19.1	18.2	n.s.
Chronic motor or vocal tics	7.8	12.2	n.s.	8.5	10.6	n.s.
Any tic/Tourette's disorder	17.2	40.8	.006	25.5	28.8	n.s.
ADHD	6.3	14.3	n.s.	8.5	10.6	n.s.
ADHD UNS	4.7	12.2	n.s.	21.3	15.2	n.s.
Any ADHD	10.9	26.5	.046	21.3	15.2	n.s.
Asperger's syndrome	3.1	4.1	n.s.	4.3	3.0	n.s.
Autistic traits (PDD NOS)	4.7	0	n.s.	0	0	n.s.
<b>Anxiety Disorders</b>	45.3	32.7	n.s.	31.9	41.5	n.s.
GAD	17.2	4.1	.038	6.4	15.2	n.s.
Social phobia	4.7	10.2	n.s.	6.4	7.6	n.s.
Specific phobia	23.4	26.5	n.s.	21.3	27.3	n.s.
Separation anxiety	6.3	2.0	n.s.	8.5	1.5	n.s.
Panic disorder	4.7	0	n.s.	2.1	3.0	n.s.
PTSD	6.3	0	n.s.	0	6.1	n.s.
2 or more anxiety disorders (not OCD)	17.2	12.2	n.s.	23.4	30.3	n.s.



OCD co-morbidity

<b>Affective disorders</b>	28.2	20.4	n.s.	19.1	28.8	n.s.
major depression	17.2	12.2	n.s.	8.5	19.7	n.s.
Dysthymia or Depression NOS	12.5	8.2	n.s.	10.6	10.6	n.s.
Bipolar disorder	0	2	n.s.	2.1	0	n.s.
<b>Disruptive behavioural disorders</b>	7.8	10.2	n.s.	14.9	4.5	.09
Oppositional Defiant Disorder	9.4	8.2	n.s.	17.0	3.0	.016
Conduct Disorder	0	2	n.s.	0	1.5	n.s.
Eating disorders	6.3	0	n.s.	0	6.1	n.s.
2 or more psychiatric disorders	43.7	42.8	n.s.	40.3	47.2	n.s.
No psychiatric disorder (except OCD)	25.0	18.4		23.4	21.2	

Table 2. Correlations between CBCL syndrome scales and OCD severity

	Withdrawn/ depressed	Anxiety/ depressed	Thought problems	Attention problems	Aggressive behaviour	Internalising dimension	Externalising dimension	Total Score
CYBOCS Total score	.18	.24*	.32**	.08	.04	.16*	.02	.15*
CGI severity	.31**	.23*	.23*	.20*	.12	.17*	.09	.19**

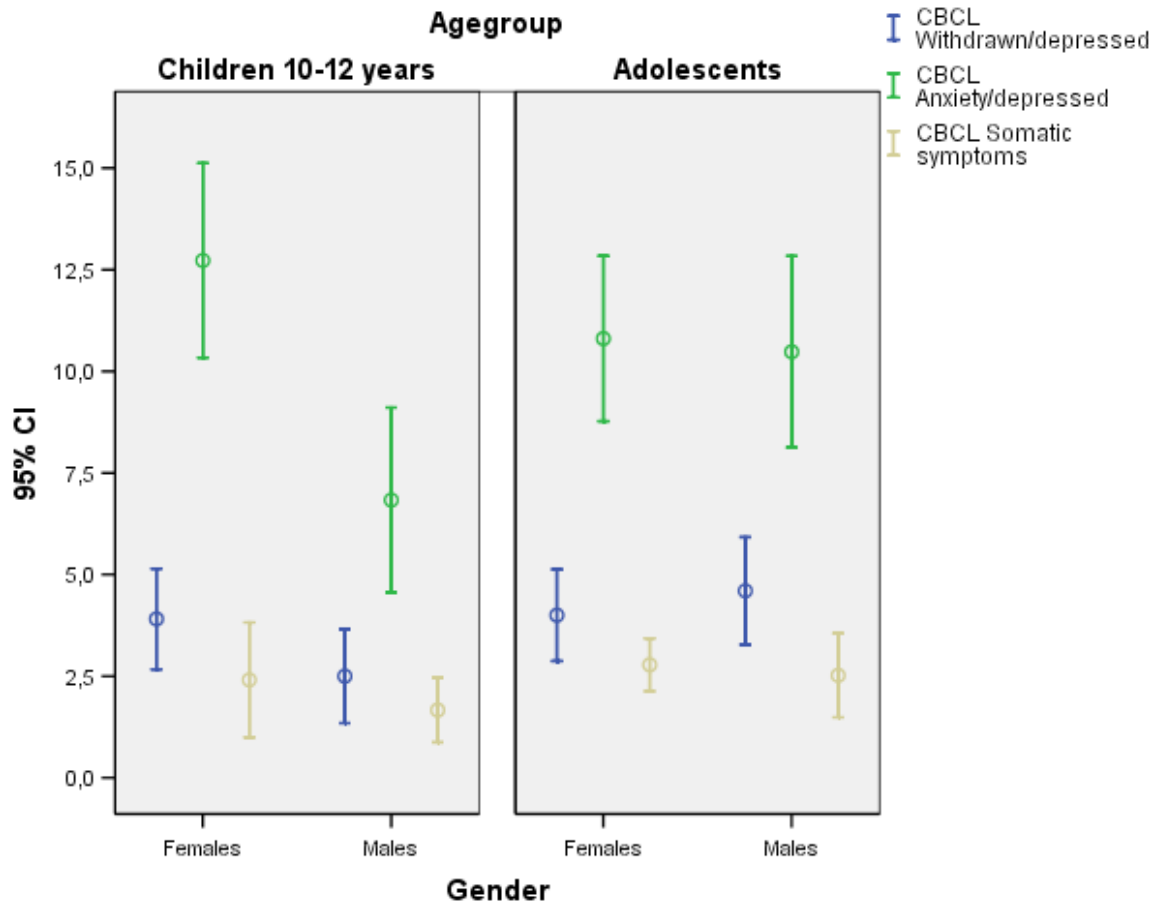


Figure 1. Differences for girls and boys and for children and adolescents respectively with regard to CBCL sub syndromes Withdrawn/depressed (n.s. respectively n.s.), Anxiety/depressed ( $t(207)=3.3, p=.001$  respectively n.s.) and Somatic symptoms (n.s. respectively n.s.).

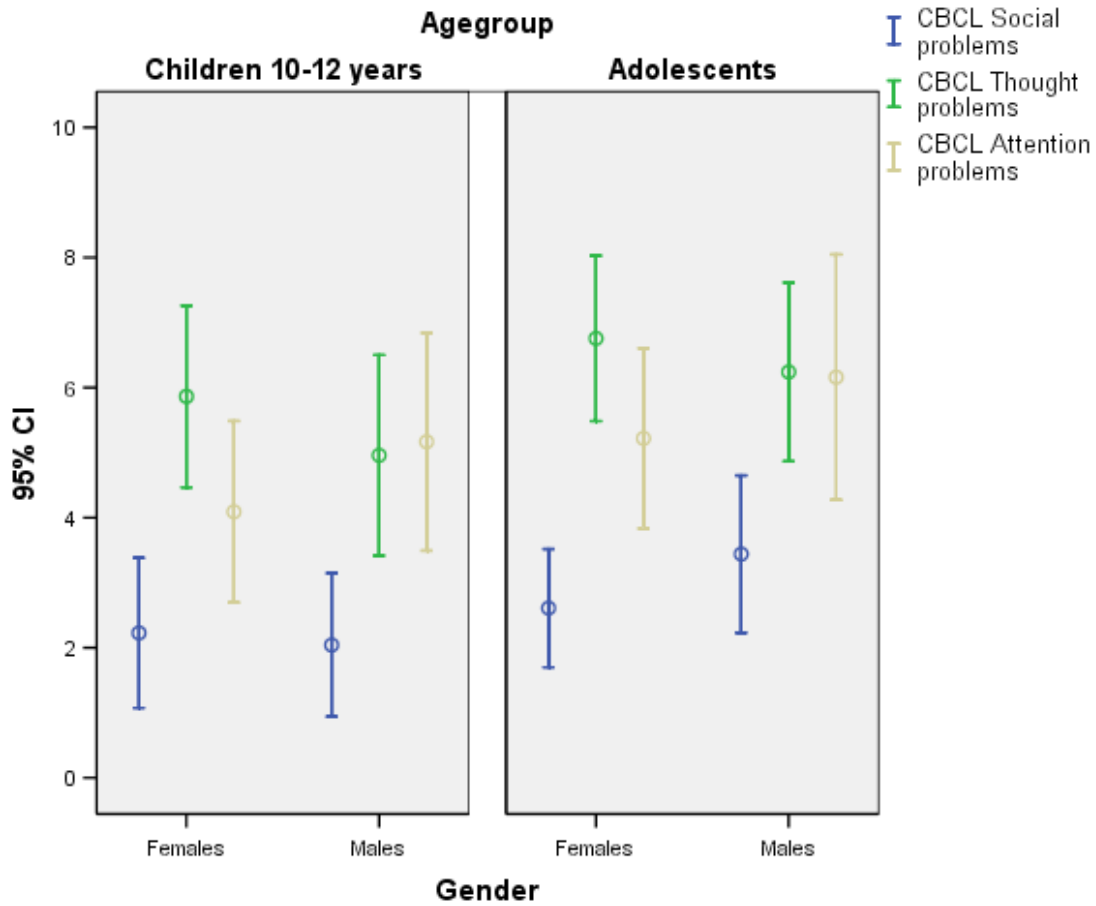


Figure 2. Differences for girls and boys and for children and adolescents respectively with regard to CBCL sub syndromes Social problems (n.s. respectively ( $t(207)=1.8$ ,  $p= .07$ ), Thought problems (n.s. respectively ( $t(207)=2.2$ ,  $p= .029$ ) and Attention problems ( $t(207)=1.86$ ,  $p= .064$  respectively ( $t(207)=1.86$ ,  $p= .06$ ))

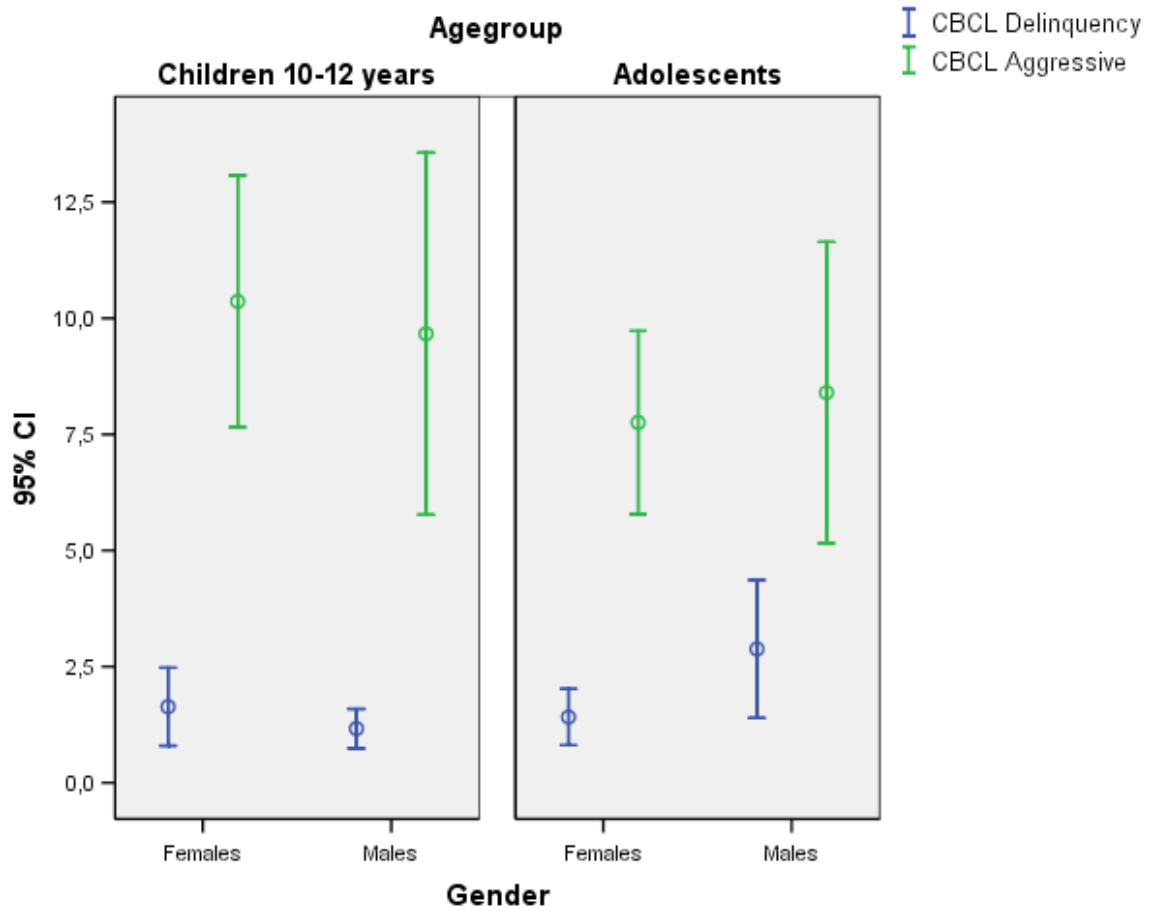


Figure 3. Differences for girls and boys and for children and adolescents respectively with regard to CBCL sub syndromes Delinquency ( $t(207)=1.86$ ,  $p= .064$  respectively n.s.) and Aggressive behaviour (n.s. respectively n.s.).

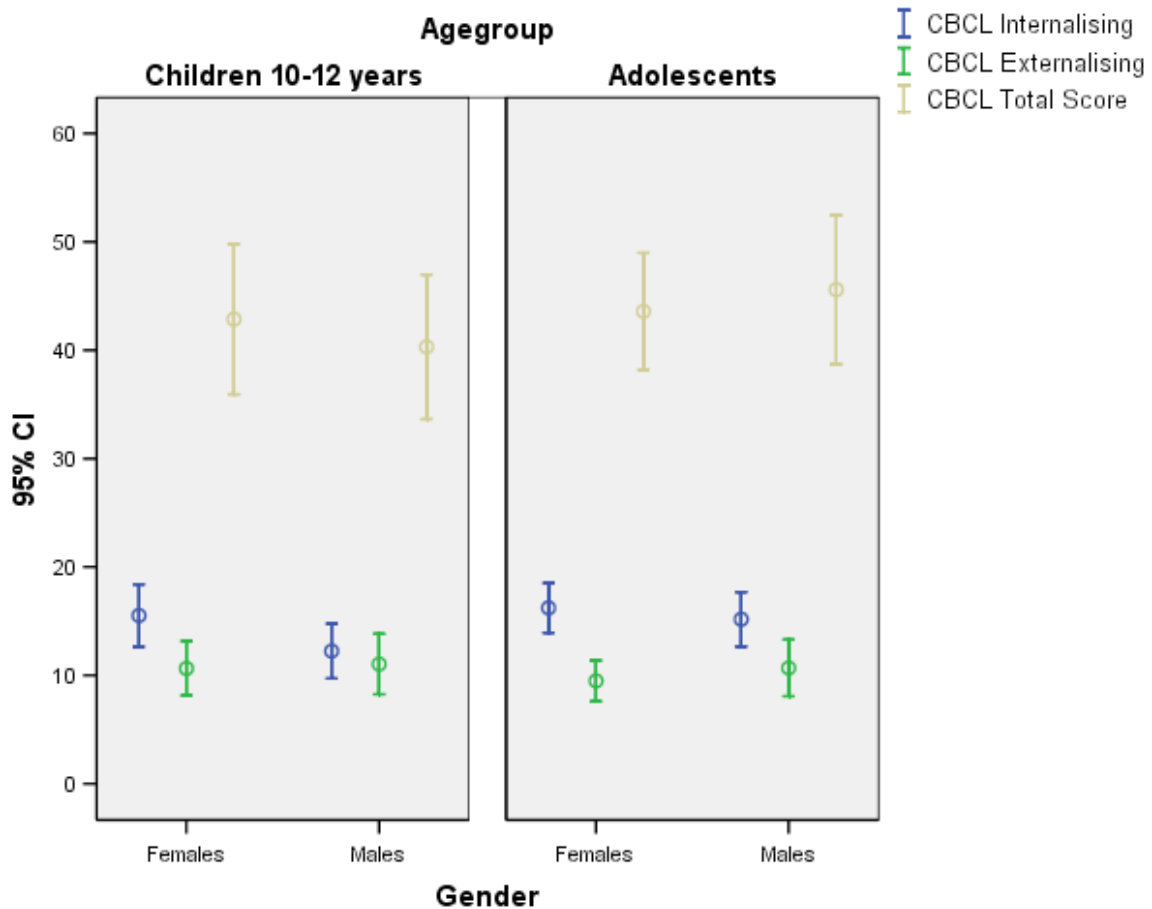


Figure 4. Differences for girls and boys and for children and adolescents respectively with regard to CBCL dimensions Internalising (n.s. respectively n.s.) Externalising (n.s. respectively n.s.) and Total Scores (n.s. respectively n.s.).

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