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The effect of comorbidity on treatment of anxious children and adolescents: Results from a large, combined sample

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Keywords: anxiety disorders, treatment, comorbidity, mood disorders, externalizing

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Running head: Comorbidity and treatment for child anxiety

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The effect of comorbidity on treatment of anxious children and adolescents: Results from a large, combined sample

Keywords: anxiety disorders, treatment, comorbidity, mood disorders, externalizing

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Abstract

Objective: The purpose of the current study was to evaluate the influence of comorbid disorders on both the degree of change and the end-point of skills-based treatment for anxious young people.

Method: Data on 780 children aged 7-17 years was compiled from a variety of samples within one clinic. All children had a primary anxiety disorder and engaged in a manualized, 10-session, skills-based treatment program. Outcome was determined according to diagnostic status as well as continuous symptom measures. Analyses compared results between four groups: no comorbidity, comorbid anxiety disorders, comorbid externalising disorders, comorbid mood disorders. All analyses were intent-to-treat.

Results: Children with comorbid depression were the least likely to be free of their primary anxiety diagnosis at the end of treatment and follow-up. According to both child and maternal reports, symptoms of anxiety reduced similarly over time in all groups, but children with comorbid mood disorders scored significantly highest at all time points. When examining effects of anxiety treatment on comorbid disorders, comorbid mood disorders but not externalizing disorders reduced significantly over time.

Conclusions: The existence of comorbid disorders does not appear to affect the rate or extent of response to skills-based treatment for child anxiety. However, comorbidity has a marked influence on the end point of treatment. Children with non-anxiety comorbidity, and especially with comorbid mood disorders demonstrate greater severity at outset and remain worse following treatment. On the positive side, treatment for anxiety disorders also appears to reduce comorbid mood disorders, although it has less effect on comorbid externalising disorders.

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3 Within current nosological systems for child and adolescent anxiety disorders, comorbidity is
4
5 the rule ¹. Up to 80% of young people who meet criteria for a primary anxiety disorder diagnosis,
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7 meet criteria for one or more additional diagnoses, especially among clinical populations. The most
8
9 common comorbid disorders are other anxiety disorders, but comorbid mood and externalising
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11 disorders are also often identified ². High levels of additional disorders are associated with all of the
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13 anxiety disorders in young people and patterns of comorbidity do not appear to differ markedly
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15 between anxiety disorders.
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20 A key consideration, both clinically and theoretically, is whether the existence or type of
21
22 comorbid conditions affect the response of anxious young people to intervention. Childhood anxiety
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24 disorders can be treated with good success using medication or skills-based programs ¹. Among the
25
26 latter, around 50-60% of children are free of their presenting anxiety disorder immediately after
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28 treatment, increasing to around 65% at follow-up ³. Although several treatment studies have
29
30 examined predictors of response within post-hoc analyses, these have generally failed to identify
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32 consistent predictors, with the most consistent identified influence being parent psychopathology ¹.
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34 However, the small samples, strong overall treatment response, and post-hoc analyses have meant
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36 that identification of predictors of response to psychological treatment for child anxiety has not yet
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38 been well addressed.
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45 Clinically there is a common assumption that existence of comorbid disorders complicates
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47 treatment and reduces treatment efficacy. Within the realm of child anxiety, several studies have
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49 empirically examined this issue e.g., ^{4,5-9}. In one of the first studies, Kendall and colleagues compared
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51 response to treatment among 173 children aged 8-13 years with primary anxiety disorders ⁷. The
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53 sample was divided into three groups for analyses: those with only a single (anxiety) disorder, those
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55 with two or more anxiety disorders and those with comorbid externalising disorders. No significant
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57 differences were identified between groups on treatment response. A similar study of children aged
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7 to 16 years with primary anxiety disorders, used the same group breakdown and also failed to show significant differences between groups on treatment response for anxiety immediately following treatment or 12 months later ⁹. In a comprehensive review of the extant literature, Ollendick and colleagues concluded that the existence of comorbid conditions does not appear to influence the response to treatment for children with primary anxiety disorders ¹⁰.

Despite these conclusions, three studies have interpreted their results differently. In one of the earlier studies, data from 106 anxious children combined from two treatment trials were dichotomized to reflect treatment success vs treatment failure ¹¹. The two groups did not differ in the presence of any comorbid disorder, nor in the presence of comorbid externalising disorders, but five of seven children with comorbid depression were treatment failures. This prompted the authors to conclude that comorbid depression could specifically undermine intervention for child anxiety. The conclusion was further supported by the higher scores among treatment failures on the Child Depression Inventory, although these scores did not predict response to treatment as reflected in change on the clinician's rating of diagnostic severity. A small study of young people specifically with OCD (N=40) similarly demonstrated fewer treatment responders among those with non-anxiety comorbidity (5 of 9) relative to those without comorbidity (18 of 19) ¹². More recently, an examination of response to treatment among 124 children aged 8-12 years demonstrated worse outcomes among those with comorbid disorders than among those with only a single anxiety disorder ¹³. Importantly, this effect was apparent when treatment response was determined via diagnosis-free rates or clinically significant change (end-point determinants) but not when response was assessed through reliable change (a measure of change over time).

A somewhat different but related issue is whether a treatment program aimed at anxiety disorders can influence comorbid conditions. Several studies have shown that treatment for one anxiety disorder can reduce other anxiety disorders ^{4, 5, 7}. This is hardly surprising given the overlap between anxiety disorders and the fact that many anxiety treatment programs are generic. A more

1 interesting question is whether treatment for anxiety reduces non-anxiety comorbidity. Few studies
2 have addressed this issue. Kendall and colleagues⁷ reported significant reductions in ADHD following
3 treatment for anxiety, but the reduction in oppositional disorder at the end of treatment did not
4 reach significance. Similarly, only 32% of externalising disorders had remitted at the end of
5 treatment for anxiety in another report from this group, although 68% had remitted 7 years later⁸.
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7 Several trials assessing treatment for childhood PTSD have shown small to moderate effect size
8 reductions in symptoms of depression and externalising, but almost none have assessed comorbid
9 diagnoses¹⁴.
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20 In summary, the majority of research that has examined the effect of comorbidity on
21 response to treatment by evaluating change across time on continuous measures has failed to
22 indicate that comorbid conditions significantly reduce treatment efficacy for anxiety in young
23 people. In contrast, a few studies that have determined treatment endpoints in a categorical manner
24 (e.g., diagnosis-free, treatment responder status) have indicated that comorbidity, especially non-
25 anxiety comorbidity might affect the final point reached within treatment. Few studies have
26 examined effects of anxiety treatments on non-anxiety comorbid conditions, but effects on
27 externalising disorders do not appear to be as extensive as they are for anxiety disorders. At present,
28 the research into these vital clinical issues is affected by key limitations. First, very few studies have
29 examined treatment response according to both change and endpoint. Further, sample sizes have
30 not been large in the context of demonstrating moderation effects. The numbers of children in most
31 studies who demonstrated non-anxiety comorbidity have been particularly small, ranging from as
32 few as 9 up to a maximum of 44. The small samples have not allowed more detailed evaluation of
33 the influence of comorbid mood disorders versus externalising disorders. The restriction among
34 some samples to children aged 14 years or less also limits the number of participants with comorbid
35 mood disorders.
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1 The current study examined data from children treated in our specialist anxiety unit over the
2 past decade, allowing examination of a large sample of anxious children and adolescents. Treatment
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4 over this time utilized a consistent package and was aimed at children and adolescents aged from 7
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6 to 17 years. The large sample allowed us to separately examine children with comorbid mood
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8 disorders and comorbid externalizing disorders.
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11 12 13 14 15 16 Method

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22 Eligible participants for the study comprised a total of 866 children and adolescents aged
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24 from 7 to 17 years (plus their parents) who were treated using a standard structured treatment
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26 program at the xxx between 2000 and 2011. Approximately 64% of the children participated in
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28 randomized clinical trials e.g.,^{15, 16} while the remainder were treated in ongoing clinical services
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30 between trials. In both cases, assessment processes were consistent and all treatment was
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32 conducted in groups using the *Cool Kids* program¹⁷.
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38 Children were included in the current study if they met Diagnostic and Statistical Manual of
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40 Mental Disorders, 4th ed. DSM-IV;¹⁸ criteria for a diagnosis of any anxiety disorder as their primary
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42 (most interfering) disorder. Exclusions were generally kept to a minimum to maximize external
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44 validity and primarily reflected conditions requiring urgent assistance (such as severe suicidal
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46 ideation or chronic school refusal) or conditions that might be disruptive to groups (such as
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48 unmedicated ADHD, severe oppositional defiant disorder across more than one setting, or moderate
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50 intellectual disability). Diagnoses were assigned based on structured interview (described below).
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53 For the purposes of the current study children were excluded from analyses if they met criteria for a
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55 comorbid disorder other than anxiety, mood, or externalising (n=86) (primarily learning disorders,
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57 Asperger's Disorder, or sleep disorders). This left a total of 780 participants (372 girls, 408 boys,
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1 mean age 10.7 years, s.d. = 2.6 years) who met criteria for the following principal diagnoses:
2 generalized anxiety disorder (48.3%), social phobia (20.6%), separation anxiety disorder (15.6%),
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4 specific phobia (6.9%), obsessive compulsive disorder (6.6%), other anxiety (2%).
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8 The sample was divided into four groups based on comorbidity. Because many children had
9 multiple comorbidities and because the number of children with both comorbid externalising and
10 mood disorders was too small for meaningful analysis, an hierarchical system was used as follows: 1)
11 no comorbid disorders (N = 76; 9.7%); 2) comorbid anxiety disorders only (N = 426; 54.6%), 3)
12 comorbid externalizing disorders (most of these children also had comorbid anxiety disorders) (N =
13 134; 17.2%), and comorbid mood disorders (most of these children also had comorbid anxiety and
14 28 (19%) had comorbid externalising disorders¹) (N = 144; 18.5%). Demographic comparison
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16 between the groups is presented in Table 1.
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27 Measures

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31 Diagnoses: Diagnoses were assigned by graduate students in clinical psychology or qualified clinical
32 psychologists following structured interview with the Anxiety Disorders Interview Schedule for DSM-
33 IV, Parent and Child versions¹⁹. Interviewers received training to criterion and research from our
34 clinic overlapping with the current sample has demonstrated inter-rater agreement of kappa = 1.00
35 for an overall diagnosis of anxiety disorder, and ranging from .68 to .93 across the major anxiety
36 disorders²⁰. Diagnoses and clinician-rated severity of each diagnosis (CSR; on a scale of 0 to 8) were
37 based on composite parent and child report. A CSR of four or more indicated that diagnostic criteria
38 were met at a clinically interfering level. The interview was repeated at post-treatment and follow-
39 up, allowing both the absence of diagnosis and CSR to be reported as outcomes.
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53 Anxiety symptoms: To measure symptoms of anxiety, children completed the Spence Children's
54 Anxiety Scale SCAS:²¹ and their parents completed the parallel parent version SCASp:²². These
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114. Internal consistency (alpha = .92) and 6-month retest reliability (alpha = .60) for both total scales are good^{21, 22}. Because of the greater proportion of missing data among paternal reports, only reports from mothers are presented in the current paper.

Negative thinking: Children completed the Children's Automatic Thoughts Scale CATS:²³, a measure of children's negative thoughts and beliefs. The measure contains four subscales, social threat (alpha = .85), physical threat (alpha = .92), failure and loss (alpha = .92), and hostility (alpha = .85). The measure also has good retest reliability over 3 months (alphas = .68-.77) and the various subscales each discriminate between relevant forms of child psychopathology (Schniering & Rapee, 2002). For the current study total scores were used to provide a measure of general negative thinking. This has a total of 40 items with a range from 0 to 160.

Externalizing symptoms: Across the decade, two different measures of externalizing symptoms were used in our Centre at different times. Approximately 24% of mothers completed the parent report form of the Child Behavior Checklist CBCL:²⁴. This widely used measure of child psychopathology provides subscales for internalising and externalising symptoms. Given our more specific measure of anxiety (described above), only the externalising subscale is reported in the current study. The remainder of mothers completed the parent report form of the Strengths and Difficulties Questionnaire SDQ:²⁵. This measure provides a briefer but very similar measure to the CBCL and produces several subscales. To produce a measure of externalising symptoms for the current study, we combined the conduct problems, hyperactivity, and peer problems subscales. Children's scores on the externalizing scales of the CBCL or SDQ were standardised across the sample and across time points (thereby allowing examination of changes across time) and results for the standard score are reported.

Treatment

1 The *Cool Kids* treatment program is a 10-session structured intervention in which children
2 and their parents are taught practical skills to help manage the child's anxiety. Active components
3
4 include psychoeducation, cognitive restructuring, in-vivo exposure, and social skills such as
5
6 assertiveness and handling teasing. Parents are active participants in the program. In addition to
7
8 learning and assisting with the strategies taught to children, parents also learn methods of
9
10 parenting, especially focussing on reducing overprotection. Parents attend all sessions for children
11
12 up to grade 6 and attend fewer sessions for adolescents, depending on the age. All children in the
13
14 current sample were treated in group format (2 hour sessions, approximately 6 families per group)
15
16 and most groups had two therapists. Therapists were either clinical psychologists or graduate
17
18 students in clinical psychology. Children with various primary anxiety disorders are included in the
19
20 same groups, which generally include children covering approximately a 2-year age span.
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26 Procedure

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29 Children's parents made contact with the xxx following referral from an external agent (most
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31 commonly word of mouth, school counsellors, general practitioners, or media stories). They
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33 underwent a brief telephone screening, following which an appointment was made for a detailed
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35 diagnostic assessment using the ADIS-CP. Questionnaires were completed prior to diagnostic
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37 interview. In the earlier years questionnaires were completed on paper, whereas from around 2009
38
39 questionnaires were completed electronically. Eligible children then presented for treatment with
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41 *Cool Kids*. Post-treatment assessment was completed within one week following the end of
42
43 treatment, or at the time of discontinuation. Follow-up data were sought from all participants
44
45 however, due to the various treatment trials, follow-up periods ranged from three to 12 months
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47 following treatment. Where more than one follow-up was conducted (for example at 3 months and
48
49 12 months), the current study used the last follow-up point available.
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56 Statistical Analyses

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Because there was no consistent measure of symptoms of depression, it was not possible to analyse the data based on continua of comorbid symptoms. Therefore to provide a more clinically meaningful evaluation, we decided to base analyses on comorbid diagnostic groups as described above. This allowed analysis of categorical data using chi-square and continuous data using mixed model analyses of variance (ANOVA). Data were analysed using both completer data, based on participants who completed a minimum of eight sessions of treatment and returned data, and intent-to-treat data including all participants who were eligible for the study and carrying the last data point forward in the case of missing data. The pattern of results was very similar for both sets of analyses. Given the similar pattern of results and the fact that the diagnostic groups did not differ significantly on number of sessions attended (see below), only the intent-to-treat data will be reported here.

Results

Treatment discontinuation and missing data

Among the entire sample, treatment discontinuation (i.e. completion of less than 8 sessions) was found among 10.8% of the no comorbidity group, 10.4% of the anxiety only group, 7.3% of the comorbid externalising group, and 12.7% of the comorbid mood disorders group, $\chi^2(3, N=676) = 1.83, p=.609$.

At post-treatment, 14.1% of the total sample failed to return data and there was a significant difference between groups, $\chi^2(3, N=780) = 12.54, p=.006$, as follows: no comorbidity, 19.7%; anxiety only, 13.4%; externalising, 6.7%; mood disorders, 20.1%. At follow-up, 30.4% of participants failed to return data, and the difference between groups was no longer significant, $\chi^2(3, N=780) = 4.73, p=.193$ (no comorbidity, 34.2%; anxiety only, 28.6%; externalising, 26.9%; mood disorders, 36.8%).

Demographic comparison

The groups showed a significant difference on age, $F(3, 776) = 40.9, p < .001, \eta_p^2 = .14$. Pairwise post-hoc comparisons indicated significant differences between those with no comorbidity and all other groups, and those with additional mood disorders and all other groups (see Table 1). The groups also differed significantly on gender, $\chi^2(3, N=780) = 19.0, p < .001$, with the greatest proportion of males in the externalising group and least in the mood disorders group. As expected, there was also a significant difference between groups in use of medication, $\chi^2(3, N=780) = 36.1, p < .001$. There were no significant differences on any other assessed demographic characteristic (see Table 1).

Diagnoses

Based on intent-to-treat data, the number of participants who were free of their primary presenting anxiety diagnosis at the end of treatment was as follows: no comorbidity, 56.6%; anxiety, 43.7%; externalising 44.0%; mood, 26.4%. These differences were significant, $\chi^2(3, N=780) = 21.8, p < .001$. The difference remained significant at the last follow-up point, $\chi^2(3, N=775) = 17.9, p < .001$: no comorbidity, 59.2%; anxiety, 52.1%; externalising 50.7%; mood, 34.0% (see Table 2).

Differences between groups on continuous measures

Due to the significant differences between groups on age and sex, these variables were entered as covariates in the analyses. Comparing the groups on the clinician-rated severity of the primary diagnosis (and including age and sex as covariates) indicated significant main effects of time, $F(2, 1548) = 103.8, p < .001, \eta_p^2 = .12$, and group, $F(3, 774) = 16.4, p < .001, \eta_p^2 = .06$, but no significant group by time interaction, $F(6, 1548) = 1.0, p = .426, \eta_p^2 = .00$. Means are presented in Table 3.

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Maternal report of anxiety symptoms using the SCAS also showed significant main effects of time, $F(2, 1496) = 54.2, p < .001, \eta_p^2 = .07$, and group, $F(3, 748) = 24.1, p < .001, \eta_p^2 = .09$, but no significant group by time interaction, $F(6, 1496) = 1.4, p = .224, \eta_p^2 = .01$. A similar pattern was evident on the child-reported SCAS - significant main effects of time, $F(2, 1450) = 32.8, p < .001, \eta_p^2 = .04$, and group, $F(3, 725) = 18.1, p < .001, \eta_p^2 = .07$, but no significant group by time interaction, $F(6, 1450) = 2.3, p = .079, \eta_p^2 = .01$.

Children's overall levels of negative thinking assessed by the CATS showed significant main effects of time, $F(2, 1472) = 21.5, p < .001, \eta_p^2 = .03$, and group, $F(3, 736) = 34.7, p < .001, \eta_p^2 = .12$, and also a significant group by time interaction, $F(6, 1472) = 8.6, p < .001, \eta_p^2 = .03$. Finally, maternally-reported externalising symptoms also showed significant main effects of time, $F(2, 1498) = 24.9, p < .001, \eta_p^2 = .03$, and group, $F(3, 749) = 43.4, p < .001, \eta_p^2 = .15$, as well as a significant group by time interaction, $F(6, 1498) = 5.7, p < .001, \eta_p^2 = .02$.

Effect of treatment on externalising and mood disorders

Among those with externalising disorders at pre-treatment, 34.2% were free of a clinical externalising diagnosis at post-treatment and 37.3% at follow-up. Among those with mood disorders, 54.5% were free of a clinical mood disorder at post-treatment and 57.3% at follow-up (see Table 2 for group breakdown).

According to CSR, repeated measures ANOVA indicated a significant reduction over time on severity of mood disorders, $F(2, 296) = 14.0, p < .001, \eta_p^2 = .09$ (Estimated marginal means = pre 5.21 (S.E. = .08), post 2.91 (S.E. = .18), follow-up 2.82 (S.E. = .18)), but a non-significant reduction in clinical severity of externalising disorders, $F(2, 326) = 2.4, p = .097, \eta_p^2 = .01$ (Estimated marginal means = pre 4.67 (S.E. = .07), post 3.62 (S.E. = .15), follow-up 3.60 (S.E. = .15)).

Discussion

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3 Interpretation of the current results needs to be qualified depending on the perspective
4 from which they are viewed. Of relevance to theory and clinical process, one would be interested in
5 the rate at which children improve. The majority of previous research has indicated that comorbid
6 disorders do not adversely affect the rate of response to cognitive behavioural treatment for anxious
7 children^{4,7,9}. Consistent with previous research, the results of the current study clearly fail to
8 indicate that the existence of comorbid anxiety, mood or externalising disorders adversely influences
9 response to skills-based treatment for childhood anxiety. There were no significant group by time
10 interactions on the measures of anxiety symptomatology, indicating that the rate at which children
11 changed over treatment and into follow-up was similar, regardless of the existence of comorbid
12 disorders. Where significant interactions were demonstrated, on measures of overall negative
13 thinking and externalising symptoms, greater changes were actually demonstrated by children with
14 comorbid mood and externalising disorders, presumably due to a higher starting point.

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17 However, a clinician perspective might ask a very different question. Clinicians are more
18 concerned with when their patient is “better”. In other words, “how likely is it that my patient will
19 be free of their presenting disorder at the end of treatment?” - that is, an end-point focus. From this
20 perspective, the existence of comorbid disorders clearly predicted a worse outcome compared with
21 children with only a single anxiety disorder. In line with other research¹³, children with comorbid
22 disorders were less likely to be free of their primary anxiety disorder at the end of treatment and at
23 the last follow-up point. They also remained more severe and impaired at the end of treatment and
24 follow-up on clinician-rated severity, anxiety symptomatology, negative thinking, and externalising
25 symptoms. The lack of significant group by time interactions noted above reflects the fact that
26 children with comorbid disorders present as more severe from the outset. Importantly, this greater
27 severity is not simply an additive consequence of having more disorders. Comorbid children
28 demonstrated higher levels of anxiety symptoms and greater clinician-rated severity of their primary
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1 anxiety disorder than did children without comorbidity. Thus, children with additional disorders,
2 arrive at treatment with more severe levels of anxiety and, although this anxiety responds just as
3 well to intervention, they remain more severe at the end of a standard treatment program.
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7 Among the comorbid disorders, comorbid mood disorders appeared to be associated with
8 the worst outcomes. Few previous studies have had the sample size to look at the distinct effects of
9 comorbid mood disorders, but some prior research has suggested this effect ¹¹. From the opposite
10 perspective, research has clearly demonstrated that adolescents with primary mood disorders are
11 harder to treat when they have comorbid anxiety disorders ^{1,10}. Young people with comorbid mood
12 disorders were more likely to be older and female. Yet worse outcomes were demonstrated for this
13 group even when these demographic factors were statistically controlled. Although depressed
14 children are likely to be characterised by motivational deficits or high levels of negative thinking, it
15 needs to be reiterated that the response to intervention, reflected in the rate of change, was not
16 affected by comorbid mood disorders - only the endpoint. Hence young people with comorbid mood
17 disorders appear to be generally more severe in their clinical presentation and this severity remains
18 following standard intervention. Previous research has also demonstrated that children with
19 comorbid mood and anxiety disorders are more severe than children with either disorder alone ²⁶.
20 Factors such as greater family loading, higher genetic loading, or stronger temperamental
21 vulnerability, may all play a role.
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44 Examination of the effect of the *Cool Kids* anxiety program on non-anxiety comorbid
45 conditions indicated some interesting results. Consistent with some previous literature, externalizing
46 disorders reduced following treatment, but this reduction seemed somewhat less than shown by
47 anxiety disorders. Only around one third of children with a comorbid externalising disorder appear
48 to lose their disorder following treatment for their anxiety. Thus better effects might require
49 programs specifically aimed at the comorbidity e.g., ²⁷. In contrast, reduction in mood disorders was
50 similar to the degree of reduction in anxiety disorders. These patterns support the nosological
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1 distinctions between anxiety and externalizing and the greater overlap between anxiety and
2 depression in youth.
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5 An obvious strength of this study is the sample size. Non-significant effects in previous
6 studies may have reflected low power and small samples also made it difficult to separately examine
7 the effects of comorbid mood and externalising disorders. The sample size in the current study
8 means that any differences that are too small to be detected are probably of little clinical
9 importance. At the same time, the combination of data to produce this sample may be a limitation.
10 By combining data from several studies and from non-research samples, a variety of sources of noise
11 may have been introduced, subsequently reducing power. Similarly, combining results from a single
12 clinic represents both a strength and limitation. The strength of this method is that it reduces noise
13 and variability by utilising a single, consistent treatment program and consistent assessment
14 methods. Its weakness may lie in a lack of generalizability.
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30 The results represent clear clinical implications. As described earlier, the conclusions can be
31 interpreted from two perspectives. The practicing therapist can be confident that using a standard,
32 empirically-validated treatment package for the management of childhood anxiety will lead to
33 consistent reductions in anxiety regardless of the existence of comorbid disorders. Hence, in line
34 with typical practice in our Centre, determination of the suitability of anxious children for treatment
35 with such a package can be based on their primary disorder and the existence of comorbid
36 conditions can be partly ignored. However, therapists also need to be aware that at the conclusion
37 of a standard period of treatment, children with comorbid disorders, and especially those with
38 comorbid mood disorders, are less likely to be fully improved. To produce maximal gains in anxiety,
39 it may be that a further period of the same treatment is all that is required. As discussed, children
40 with comorbid disorders improved at the same rate. Hence a slightly longer program continuing the
41 same skills is likely to eventually reach the same endpoint. On the other hand, the introduction of
42 additional techniques to deal with the comorbid symptoms may be needed to produce the greatest
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1 improvements or alternately may help to speed up improvement for children with comorbid
2 conditions. Finally, reduction of comorbid conditions is of great clinical importance and it appears
3 that treatment of the primary anxiety disorder will result in some changes in the comorbid
4 conditions. However, to achieve maximum reductions in comorbid externalizing disorders, it is likely
5 that combined treatments will be required (Levy et al., 2007). In contrast, general anxiety reduction
6 programs or even broader transdiagnostic programs are likely to show good effects on both the
7 primary anxiety disorder and additional mood disorders.
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5 Footnote:
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9 1. Removal of the 28 children with additional externalizing disorders did not change the pattern of
10 results.
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Table 1. Comparison on demographic variables between the four groups.

Factor	No comorbidity (N=63)	Comorbid anxiety only (N=422)	Comorbid Externalising disorder (N=137)	Comorbid Mood disorder (N=153)	Statistic
Age in months (s.d.)	130.8 (29.6)	122.9 (28.2)	120.6 (25.7)	152.4 (34.6)	$F = 40.9, p < .001$
Sex (% males)	63.2	49.8	64.9	42.4	$\chi^2 = 19.0, p < .001$
Taking psychoactive medication (%)	10.5	13.8	29.1	32.6	$\chi^2 = 36.1, p < .001$
Born Australia (%)	76.0	74.0	74.4	75.8	$\chi^2 = 4.9, p = .558$
Family type (% biol)	90.8	85.7	81.7	80.6	$\chi^2 = 5.2, p = .155$
Paternal university education (%)	67.4	48.2	47.6	46.2	$\chi^2 = 9.0, p = .172$

Table 2: Percentage of each group who no longer met criteria for various disorders at post-treatment and follow-up (based on last data point carried forward).

Factor	No Comorbidity (N=76)	Comorbid Anxiety only (N=426)	Comorbid Externalizing Disorder (N=134)	Comorbid Mood disorder (N=144)
End of Therapy:				
Primary Anxiety Disorder	56.6%	43.7%	44.0%	26.4%
All anxiety disorders	NA	29.1%	24.6%	18.1%
Comorbid Extern. Disorder	NA	NA	34.3%	39.3%*
Comorbid Mood Disorder	NA	NA	NA	54.5%
Last Follow-Up:				
Primary Anxiety Disorder	59.2%	52.1%	50.7%	34.0%
All anxiety disorders	NA	37.1%	32.8%	23.6%
Comorbid Extern. Disorder	NA	NA	39.6%	27.6%*
Comorbid Mood Disorder	NA	NA	NA	57.3%

Note: * based on those who had an externalizing disorder at baseline.

Table 3: Estimated marginal means and standard errors (in parentheses) on continuous measures controlling for age and sex across the four groups at post-treatment and follow-up.

	No comorbidity	Comorbid anxiety only	Comorbid Externalising	Comorbid Mood
CSR				
Pre	5.7 (0.09)	6.5 (0.04)	6.5 (0.07)	6.9 (0.07)
Post	3.1 (0.23)	3.9 (0.10)	4.0 (0.18)	4.7 (0.18)
Follow-up	3.0 (0.25)	3.5 (0.11)	3.7 (0.19)	4.2 (0.19)
SCAS-p				
Pre	24.6 (1.62)	34.7 (0.71)	36.8 (1.25)	42.6 (1.28)
Post	16.7 (1.65)	25.1 (0.72)	26.1 (1.28)	31.6 (1.30)
Follow-up	15.4 (1.67)	22.9 (0.73)	23.7 (1.29)	29.4 (1.32)
SCAS				
Pre	23.5 (2.01)	32.8 (0.84)	33.8 (1.49)	43.0 (1.54)
Post	17.7 (1.94)	24.5 (0.81)	24.5 (1.44)	32.0 (1.49)
Follow-up	15.8 (1.92)	22.2 (0.80)	21.9 (1.43)	28.9 (1.47)
CATS				
Pre	19.0 (3.14)	29.1 (1.35)	35.2 (2.42)	57.2 (2.47)
Post	14.1 (2.71)	20.2 (1.17)	24.5 (2.08)	38.8 (2.13)
Follow-up	13.3 (2.62)	18.4 (1.13)	22.2 (2.01)	34.2 (2.06)
Externalising				
Pre	-0.1 (0.11)	-0.0 (.05)	0.9 (.08)	0.8 (.08)
Post	-0.3 (0.11)	-0.2 (.05)	0.6 (.08)	0.4 (.08)

Follow-up	-0.4 (0.11)	-0.3 (.05)	0.4 (.09)	0.3 (.09)
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Note: CSR - Clinician severity rating of primary anxiety diagnosis; SCAS-p - Spence Children's Anxiety Scale, parent report; SCAS - Spence Children's Anxiety Scale (child report); CATS - Children's Automatic Thoughts Scale; Externalising - Maternal rated externalising symptoms (standardised).

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