Abstract

Objective: To examine the effectiveness of a transdiagnostic program (i.e., EMOTION) targeting symptoms of anxiety and depression in school children by comparing the intervention condition (EC) to a control condition (CC).

Method: A clustered randomized design was used with schools as the unit of randomization. Children (N = 1,686) aged 8 – 12 years in 36 schools completed screening using the Multidimensional Anxiety Scale (MASC-C) and The Mood and Feelings Questionnaire Short version (SMFQ). Scoring 1 SD above a population-based mean on anxiety and/or depression, 873 children were invited to participate. Intent-to-treat analyses were performed, and mixed effects models were used.

Results: Analyses revealed significant reductions of anxious and depressive symptoms as reported by the children, where children in the intervention condition EC had almost twice the reduction in symptoms compared to the control condition CC. For parent report of the child's depressive symptoms, there was a significant decrease of symptoms in the intervention condition EC compared to CC. However, parents did not report a significant decrease in anxious symptoms in the intervention condition EC as compared to CC.

Conclusion: A transdiagnostic prevention program, provided in schools, was successful in reducing youth-reported symptoms of anxiety and depression, and parent-reported depression. The EMOTION program has the potential to reduce the incidence of anxious and depressive disorders in youth.

Keywords: Anxiety, depression, transdiagnostic intervention, prevention, early intervention

Public health significance: Anxiety and depression are common in youth and have unwanted effects on their functioning. Targeting both anxiety and depression in one protocol has important public health significance: symptom levels can be reduced thus preventing children from developing full blown disorders.
Anxiety and depression are prevalent and impairing disorders in childhood (e.g., Merikangas, Nakamura, & Kessler, 2009). The disorders often co-occur and may result in greater impairment and worse prognosis (Cummings, Caporino, & Kendall, 2014). Youth with subclinical levels of anxious and depressive symptoms experience significant impairment, and the symptoms predict later disorders (Kovacs & Lopez-Duran, 2010; Pine, 2007). Despite the high prevalence and negative sequela, there is a gap between the children in need and those few receiving care (Chavira, Stein, Bailey, & Stein, 2004; Heiervang et al., 2007). Prevention in a school setting with early identification and initiation of early symptom-reducing interventions may bridge this gap. Previous research suggests modest, but positive effects regarding prevention of anxiety and depression in school settings (e.g., Werner-Seidler, Perry, Calear, Newby, & Christensen, 2017). Transdiagnostic interventions targeting more than one disorder/problem, are promising approaches to tackle both symptom presentations in anxious and sad children (Ehrenreich-May & Chu, 2014).

The present study evaluated the effectiveness of a ten-week transdiagnostic indicated prevention program (i.e., EMOTION; Kendall, Stark, Martinsen, O'Neil, & Arora, 2013) targeting anxious and depressive symptoms in children aged 8 – 12 years compared to a control condition (CC). We hypothesized that the intervention would be more effective than CC as measured by a decrease in symptoms of anxiety and symptoms of depression reported by children and by parents. A prior study (Martinsen, Kendall, Stark, & Neumer, 2016) found high acceptability. The current study is the largest to date investigating the effectiveness of a transdiagnostic prevention program in schools.

**Method**

**Study design and participants**

This study used a clustered randomized design, for description of protocol, see Patras et al. (2016). Schools (36 from seven sites in Norway) were randomized. Allocation of the schools to (a) EMOTION intervention (EC) or (b) control condition (CC) involved pairing
The transdiagnostic EMOTION program

53 schools based on geography, school-size and demography, and then randomly assigning
54 schools. The Regional Committees for Medical and Health Research Ethics (2013/1909/REK
55 South-East) approved the study.

56 Recruitment used multiple gating as symptomatic children were the target group for
57 the intervention. Children and parents were informed about the study, then children
58 experiencing symptoms of anxiety and/or depression and with parental consent, were
59 screened. Inclusion/exclusion criteria are in Table 1. The parents of children scoring above the
60 cut-off completed questionnaires. For demographics and flow of children in study, see Table
61 1 and Figure 1. Insert Table 1 and Figure 1 about here

62 Measures

63 MASC-C/P (March, 1997). This 39-item, child self-report, assesses anxiety in youth
64 ages 8 - 19 during the last two weeks. Internal consistency of the MASC-C in the present
65 study was α = 0.91 and α = 0.90 for MASC-P.

66 SMFQ-C/P (Angold, Costello, Messer, & Pickles, 1995). The Mood and Feelings
67 Questionnaire Short version (SMFQ) has 13 questions assessing cognitive, affective and
68 behavioral-related depressive symptoms in youth ages 8 – 18 during the last two weeks.
69 Internal consistency of the SMFQ-C in the present study was α = 0.94, for the parent version
70 SMFQ-P, α = 0.88.

71 The intervention and procedures

72 The indicated preventive intervention was the Norwegian version of the
73 transdiagnostic EMOTION, Coping Kids Managing Anxiety and Depression program
74 (Martinsen, Kendall, Stark, Rodriguez, & Arora, 2014) for youth aged 8 – 12 years
75 considered at-risk for emotional difficulties. EMOTION is cognitive-behavioral and based on
76 the notion that anxiety and depression arise from a combination of a diathesis that in the
77 presence of stress leads to their expression. The intervention targets disturbances in cognition,
78 affect regulation, problem solving and coping skills that are indicated as transdiagnostic
The transdiagnostic EMOTION program

mechanisms of change (Kendall et al., 2014). The EMOTION intervention includes group meetings with children and with their parents (see Table 2).

Primarily psychologists and school health nurses provided the EMOTION intervention after a 3-day training. CBT supervisors gave weekly supervision to EMOTION group leaders.

The control condition (CC) involved normal contact with school health nurse/physician.

Statistical analysis

Power calculations accounted for multilevel data with an effect size of 0.35, power of 0.80, an alpha of 0.05 (see also Patras et al., 2016). Accordingly, the number of children needed was 630 recruited from 36 schools.

Mixed effects models were used, giving valid inference for missing at random values in dependent variables. Fixed effects included a time by randomization group interaction, and analyses were adjusted for gender and age group (3rd and 4th grade = younger; 5th and 6th = older). Subgroup analyses for gender and age group were performed; results can be obtained from first author. The missing at random assumption was supported by statistical analysis.

Intent-to-treat analysis (ITT) was used. The statistical program IBM SPSS (version 22) was used for descriptive analyses. Estimation of mixed effects models used the R (The R Foundation for Statistical Computing, Vienna, Austria) package nlme.

Results

Means on primary outcomes of anxiety and depression as reported by children and parents are presented in Table 3.

Intervention effects – children

We first ran the analyses with schools included. This multilevel model was unstable for anxiety and within some subgroups for depression, so models were run without the school level for child- and parent data. The results are in Table 4. The interaction of Time and
Condition was significant, indicating a larger reduction in anxious symptoms in the EC compared to CC. In the EC, there was a reduction in anxious symptoms of 11.83 points, corresponding to a reduction between 17.4% and 19.7% depending on gender and age group. In CC, the reduction was 4.63 points, corresponding to a reduction between 7.0% and 8.0% depending on gender and age group. There was a significant difference between the EC and CC at posttreatment where the CC youth were 5.35 points higher than the EC youth, see Figure 2A. We found a significant difference in the two conditions for gender, where girls had 6.99 higher scores than boys. The difference by age group was not significant in the two conditions.

For depressive symptoms, the Time X Condition interaction was significant, \( p = 0.04 \). The intervention resulted in a decrease in depressive symptoms of 2.31 points, corresponding to a reduction between 21.0% and 25.0% depending on gender and age group. The CC reduction was 1.50 points, corresponding to 14.6% and 17.6%. At pre-intervention, the difference between the conditions was significant, where CC was 0.73 points lower than EC. At postintervention, the difference was not significant (see Figure 2B).

**Intervention effects by parents’ report**

Parent report was collected from 615 parents, where 568 answered both primary outcome questions at pre- (\( n = 268 \) EC, \( n = 300 \) CC), and 421 parents provided answers post-intervention (\( n = 193 \) EC, \( n = 228 \) CC). Non-responders at both T1 and T2 were excluded from analysis.

The Time X Condition Interaction was not significant for parent-reported anxiety (Table 4). There were significant differences between conditions at both pre- and post-intervention. At pre- and at post, the parent reported EC scores were higher than CC.
There was a significant parent-reported Time X Condition interaction on child depressive symptoms (Table 4). The pre-intervention parent reported symptoms were higher in the EC with 2.06 points, $p < 0.001$. At post-intervention the difference was not significant (see Figure 2 B). The adjustment variables age and gender were not significant.

**Discussion**

The present results indicate that a transdiagnostic program produced significant reductions in anxious symptoms as reported by the children. In fact, children who received the EC reported more than twice the reduction in anxious symptoms as compared to CC. The results also indicated a significantly higher reduction in child-reported depressive symptoms for the EC compared to CC. Hence, the EC condition was more effective than CC as measured by a decrease in child-reported depressive and anxious symptoms. Parents also reported significantly higher reductions in depressive symptoms in the EC compared to CC. Parent-report of change in anxious symptoms was not significant.

The positive effect of the EMOTION intervention on child reported anxious symptoms is in accordance with previous research in which children with anxious symptoms benefitted from CBT (e.g., Teubert & Pinquart, 2011). Indeed, the findings are consistent with the summary of school-based CBT-interventions by Mychailyszyn, Brodman, Read, and Kendall (2012): youth with elevated levels of anxious symptoms who received an intervention had significantly greater reductions in symptomatology than did controls. Research has also shown that (a) childhood anxiety symptoms are a risk factor for the development of anxiety disorders (Pine, 2007), and (b) high levels of anxiety predict high levels of depressive symptoms later (Goodwin, Fergusson, & Horwood, 2004; Kovacs & Lopez-Duran, 2010). It has been suggested that anxiety has depressogenic effects, where anxiety-driven behaviors can result in feelings of sadness (Cummings et al., 2014; Garber & Weersing, 2010).
Accordingly, reductions in anxiety could change the developmental trajectory – preventing later anxiety and depressive disorders.

CBT has been found to be effective for preventing depression in youth (e.g., Clarke et al., 2001). Some studies indicate lower response rates to CBT (March et al., 2004), while others have indicated better response rates (Stark, Streusand, Prerna, & Patel, 2012).

Mychailyszyn et al. (2012) reported that youth with elevated symptoms of depression receiving an intervention did not get greater symptom reductions than did controls. Stice, Shaw, Bohon, Marti, and Rohde (2009), however, reported that in 13 of 32 prevention programs, the interventions showed greater decreases in symptoms compared to controls. In our study, the EC condition had a significantly greater decrease of depressive symptoms than CC. Subclinical depressive symptoms are meaningful predictors for later development of disorders (e.g., Kovacs & Lopez-Duran, 2010), and for each depressive symptom the risk for later disorder increases about twofold (Keenan, Feng, Hipwell, & Klostermann, 2009). Hence, even modest reductions in depressive symptoms may be important for long-term prevention.

Preventing or delaying the onset of disorders can have public health benefits: Stockings et al. (2016) reported that preventive programs were associated with a decrease in risk for internalizing disorder onset.

Although the EC had larger symptom reductions than CC, both conditions showed a decrease in symptom levels. Some reductions among controls is not uncommon (e.g., Kendall, Hudson, Gosch, Flannery-Schroeder, & Suveg, 2008). It is also possible that controls learned coping skills as teachers in control schools attended workshops on how to help anxious/sad children.

Parents reported that children in the EC group had a significantly greater reduction in symptoms of depression than CC although this was not the case for anxious symptoms. Note that parents reported lower symptom levels than the children. Although having multiple
The transdiagnostic EMOTION program

informants is recommended, parent-child disagreement is common (e.g., De Los Reyes et al., 2015). This is especially so for internalizing problems that are difficult for parents to identify (Comer & Kendall, 2004) and possibly to observe changes in these symptoms.

Before participating, EC children reported significantly higher depressive scores than CC children (Table 3). This difference is surprising given randomization. Examining parent-reported demographics (Table 1) revealed higher pre-intervention child stress levels in the EC which could contribute to the difference. Further, there was a higher dropout pre-intervention in the EC condition than in CC. The intensity of the intervention may account for the higher dropout, and initiatives to make the intervention more flexible could be important for dissemination.

The study had several strengths: it was conducted in the “real-world” with group leaders conducting EC groups in addition to usual work load. Children were recruited from urban and rural schools. Established measures were used to identify and recruit children, treatment integrity was secured, and sound statistical methods were used. However, limitations merit mentioning: a low rate of the overall school population participated in the study as at-risk children were targeted, knowledge about the school being in CC or EC condition could have influenced the recruitment and/or the reporting of symptoms, and recruitment was based on child report. Although screening all children could have increased the participation rate, this was not possible due to Norwegian ethical guidelines. Because the aim was to recruit children with elevated symptoms (i.e. an indicated approach), the sample exhibited more problems than many school children.

Conclusion

Children at risk for developing internalizing disorders benefitted from receiving a transdiagnostic intervention with significantly higher reduction in both anxious and depressive self-reported symptoms and depressive symptoms as reported by parents.
Future research could focus on identifying which specific mechanisms account for the reduction in anxious and depressive symptoms, possibly done through dismantling studies. Such studies could include functional outcomes and innovative research designs. When implemented in community settings, the EMOTION program holds the promise of being an effective preventive intervention with the potential of reducing the incidence of anxious and depressive disorders in youth.

References


